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Ontario

Ministry of the Environment

Annual Report 1977·78

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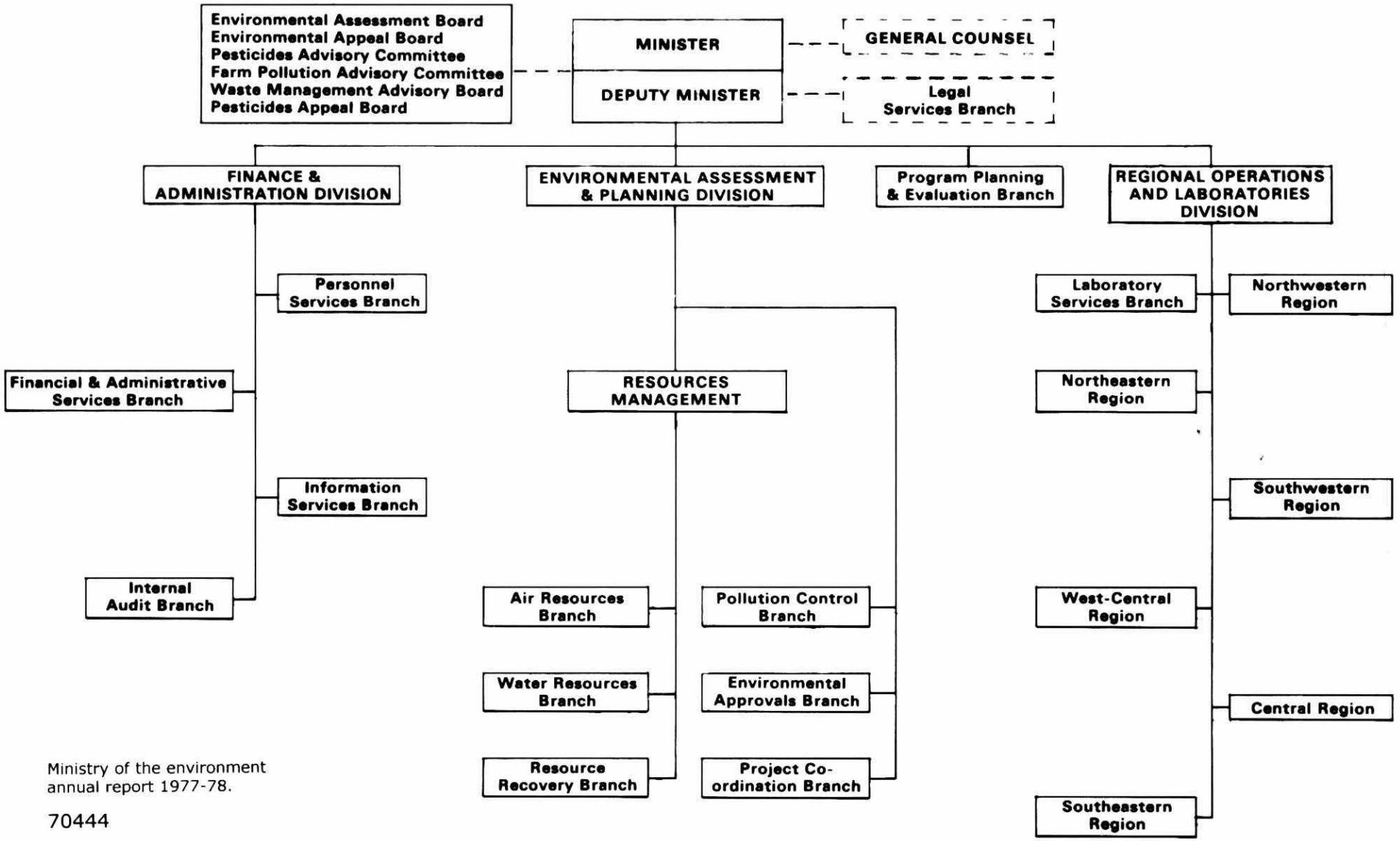
MINISTRY OF THE ENVIRONMENT — APRIL 1, 1977 - MARCH 31, 1978



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To:

The Honourable
Harry C. Parrott, D.D.S.,
Minister.

Sir,

I have the honour to submit for your approval the annual report of the Ministry of the Environment for the year 1977-78.

Respectfully submitted,

K. H. Sharpe

Kenneth H. Sharpe
Deputy Minister

To:

Her Honour,
The Lieutenant-Governor
of the Province of Ontario.

May it Please Your Honour,

I have the privilege to present the annual report of the Ministry of the Environment for the fiscal year beginning April 1, 1977, and ending March 31, 1978.

Respectfully submitted,

Harry Parrott

Harry C. Parrott,
Minister

The Honourable Harry C. Parrott, D.D.S., was appointed Ontario Minister of the Environment on August 18, 1978, transferring from his former portfolio as Minister of Colleges and Universities, an office he held since October 7, 1975.

Serving as Minister of Environment Ontario during the fiscal year 1977-78, were the Honourable George R. McCague and the Honourable George A. Kerr, Q.C.

Mr. McCague served as Minister from January 21, 1978 to August 18, 1978, when he was appointed as Chairman of the Management Board of Cabinet.

Mr. Kerr served as Minister from October 7, 1975 to January 21, 1978, when he was appointed Provincial Secretary for Justice, and Solicitor General.

goals and achievements, 1977-78

Ontario's pioneering commitment to environmental protection has resulted in the development of legislation, of research programs, and of policies which have made the Province a recognized leader in the environmental field.

The Ministry was established in 1972 to consolidate responsibility for all aspects of environmental protection, enhancement, and restoration under one agency of the Ontario Government. The operating legislation of the Ministry includes legislation which established previous agencies and now comprises:

The Ontario Water Resources Act,
The Environmental Protection Act, 1971
The Pesticides Act, 1973
The Environmental Assessment Act, 1975

goals

To provide the eight million citizens of the Province with effective environmental management, Environment Ontario has set four major long-term objectives:

- to control contaminant emission;
- to establish environmental safeguards to protect human health and the natural environment;
- to manage Ontario's water resources and to manage waste;
- to develop and maintain measures to preserve, restore, and enhance the natural environment.

The Ministry is organized for the provision of a wide range of services through a regional structure, established in 1974. Direct services are provided from six major regional bases and 23 district offices which serve as key delivery points for inspection and pollution abatement activities and local approvals in order to bring service and control functions closer to the people they affect.

A close working relationship is maintained with municipalities, with the Ministry providing consultation and development services with regard to water management and pollution control. As part of this tradition of service the Ministry itself has constructed and operates more than 300 water and sewage treatment plants, and works closely with municipalities to help them develop and maintain their water and sewage treatment facilities.

achievements

During 1977-78, the Ministry advanced toward its goals on many fronts. The activities and achievements of Ministry programs are reported herein by Divisions, Operating Branches and Regions, and include the following highlights of the year's progress:

environmental health

- The Ministry assumed the co-ordinating role in the Fish Contaminants Program -- including responsibility for fish testing and dissemination of public information -- in co-operation with the Ministry of Natural Resources and with medical advisors of the Occupational Health and Safety Division of the Ministry of Labour. Five publications containing comprehensive guidelines on the consumption of sport fish from 450 Ontario lakes and waterways were published and made available to the public in April 1978. Prior to publication, and as test results were completed, 12 environmental health bulletins were prepared and distributed monthly. During 1977-78, about 13,000 fish, weighing approximately six tons, were analyzed for trace contaminants;

- Nine health-related environmental research projects were approved for funding through the Provincial Lottery Trust fund at a total cost of $1.0 million;

- The Mosquito Control Program undertaken in co-operation with the Ministry of Health contributed to successful control of mosquito populations for the second consecutive year: no human cases of encephalitis were reported during 1977-78;

- An asbestos monitoring program affecting all municipal water supplies was initiated as a result of new monitoring technology. To safeguard public health against any contaminants, a total of 12,000 drinking water samples were analyzed throughout the Province to ensure that community water supplies are potable.

resource recovery

- The Ontario Centre for Resource Recovery at Downsview, including the experimental plant and laboratory, was completed and opened in August of 1978, as the first facility of its kind in Canada, and the fourth to be constructed in the world.

new service systems

- The construction of 70 miles of trunk sewer and the 160 million gallon per day sewage treatment plant for the York-Durham project was on schedule for the target opening in 1980, the biggest single servicing project ever undertaken by the Ministry;

- Eleven new sewage treatment plants and nine new water treatment plants were put into service across

the Province. At year-end, 343 communal sewage works with a total design capacity of 1.1 billion Imperial gallons per day were in operation. Water works in the Province numbered 467 with a total design capacity of 2 billion Imperial gallons per day.

great lakes

- Progress was made in research, surveillance, and monitoring to clean up pollution in the Great Lakes under the Canada-Ontario and the Canada-United States Great Lakes Water Quality agreements. At year-end over 210 sewage treatment plants, or 85 per cent of the total hydraulic capacity of all sewage plants in the Province, were undertaking phosphorus removal;

- The Pollution from Land Use Activities Reference Group (PLUARG) study under the International Joint Commission, designed to remedy pollution to the Great Lakes from land runoff, was completed.

recreational lakes

- Extensive surveys and monitoring of water quality continued in Ontario inland recreational lakes and watersheds, including field work in connection with the Lakeshore Capacity Study designed to quantify the effects of cottage development on lake water quality, and provide acidic precipitation data.

monitoring and sampling

- Expansion of the Ministry's laboratories and services, including the addition of new scientific equipment and research facilities to improve capabilities in the detection, analysis, and control of environmental contaminants, enabled the laboratories to respond to an eight per cent increased demand for tests of all kinds, which totalled 1,780,000 in number;

- Progress was achieved in air monitoring techniques and air quality improvement, and the Air Pollution Index daily monitoring system extended to include the City of Sarnia.

environmental studies

- Major environmental studies were in progress at Nanticoke, Sudbury, Elliot Lake, Port Grandby and elsewhere. The Nanticoke Environmental Management Program (NEMP) was established as a joint undertaking of the Ministry with Ontario Hydro, Environment Canada, Texaco, and the Steel Company of Canada to ensure maximum environmental safeguards when the huge industrial, chemical, and hydro complex becomes fully operational. The site will be one of the most thoroughly and intensively monitored areas in the world to ensure a clean environment;

- Environmental engineering reviews and approvals were carried out on major Ontario Hydro projects, and submissions presented to the Royal Commission on Electric Power Planning, including Ministry views on significant environment policy matters related to nuclear plants.

contaminants research

- The Ministry's Hazardous Contaminants Program was expanded, and significant findings obtained through research and surveys conducted by the Hazardous Substances Committee's four working groups: Source Inventory, Organics, Inorganics, and Radioactivity. The Committee is inventoring industrial establishments in the Province to determine the use and handling of a selected number of chemicals which could have a hazardous reaction on health or the natural environment, and is working in close liaison with Environment Canada.

environmental assessment and planning division

Assistant Deputy Minister: J.W. Giles

Executive Director: W.B. Drowley

air resources branch

Director: A.J. Harris

The Air Resources Branch supplies base information for the development of air quality management strategies and Ministry policies directed at achieving and maintaining desirable air quality in Ontario. The information consists of comprehensive air contaminant measurements, detailed knowledge of new technology, and recommendations concerning air quality criteria and standards.

Air Quality & Meteorology Section

This Section maintains the Ontario air monitoring network which, in 1977-78, consisted of 1,400 air quality and meteorological instruments in continuous operation in 100 areas. Altogether, 2.5 million data points were computer processed and assessed. An air quality trend analysis for the period 1971-77 inclusive shows a marked improvement in the levels of sulphur dioxide, suspended particulate matter, and carbon monoxide in all major cities of the Province. Nitrogen dioxide and hydrocarbons (precursors for the formation of photochemical oxidants) and ozone, monitored since 1974, do not show a consistent trend.

The Air Pollution Index, the basis of Ontario's Alert System, continued to be publicized daily for Windsor, Hamilton, Toronto, Sudbury, Welland, Niagara

Falls, New Sudbury, and Coniston. It was expanded to include Sarnia in 1977.

The Section used air quality models in transboundary studies to predict the air quality impact of the proposed Ontario Hydro Atikokan Generating Station in Quetico Park located in the boundary area of Ontario and Minnesota. The results indicated that both Ontario and Canadian short- and long-term air quality standards would be met and there should be no adverse effect on vegetation in the area resulting from the emissions of this plant. An air monitoring program was being planned to verify these predictions.

The Section updated the air pollutant emission inventory used in air pollution modelling and expanded it to cover most of Ontario. Data was provided to Environment Canada and the U.S. Environmental Protection Agency to carry out pollution studies on an international scale.

The Section carried out the wind trajectory analyses for acid rainfall in central Ontario during 1977. The analyses show that emissions from smelters in the Sudbury area provide a minor contribution to the rainfall acidity reported.

Criteria Development and Program Planning Section

In 1977-78, this Section established 12 guidelines for new contaminants in Ontario and prepared detailed reports for seven environmental appraisals. Section members also worked with six federally-organized task forces to produce regulations or guidelines for various industries.

The section developed a formal procedure for Ministry participation in the enforcement of federal regulations and guidelines in Ontario. Using this procedure, the Section made recommendations for Ontario's participation in the enforcement of federal regulations for the secondary lead smelting industry and the asbestos mining and milling industry.

Phytotoxicology Section

The Phytotoxicology Section conducted soil and vegetation assessment studies near 104 industrial and other sources in southern Ontario in 1977-78. Investigation reports were provided to regional managers for use in environmental management programs. The Section also investigated more than 200 vegetation complaints from the public of which 50 per cent were confirmed as being caused by pollutants. Investigation reports were provided to the complainants, the alleged offending sources, and the Board of Negotiation.

In 1977-78, the Section investigated the effects of fluorides emitted by industries manufacturing hydrofluoric acid, fertilizers, steel, aluminum, uranium hexafluoride, brick, ceramic, frit, and glass. The Section also investigated the effects of sulphur dioxide, lead, ammonia, boron, ethylene, nickel, cobalt, and mercury emitted by various industries in southern Ontario. In the City of Toronto, lead-contaminated soil was replaced on residential properties adjoining several industries.

During the 1977 crop-growing season, the Section conducted extensive field assessment surveys to determine the degree and extent of photochemical oxidant (ozone and/or peroxyacetyl nitrate) injury on the following crops: white bean, tobacco, tomato, potato, and muck crop vegetables. The degree of oxidant injury to crops was either similar or slightly more severe in 1977 as compared to 1976.

At Nanticoke, the Section continued pre-operational baseline studies where major operations by Ontario Hydro, Stelco, and Texaco are planned. No fluoride or sulphur dioxide injury has been observed on vegetation in the

study area to date, but ozone injury has occurred annually on established indicator plants.

The Section collected 9,807 vegetation and soil samples for laboratory examination (chemical analysis, herbarium, pathology, and histology). Phytotoxicology guidelines for excessive levels of contaminants in soil and vegetation were developed for 19 contaminants. The Section also conducted 19 research studies both in the field and in controlled environment greenhouse and growth chamber facilities. Some studies involved differential diagnosis of contaminants and crop injury protection.

Phytotoxicology displays on the effects of various contaminants on vegetation were shown at the Plant Show in April, the International Air Pollution Control Association Conference in June, and the International Plowing Match in September.

During 1977, five Phytotoxicology papers were published in scientific journals, eight papers were presented to technical conferences, and 23 extra-ministerial activities were undertaken by Phytotoxicology staff in conjunction with provincial, national, and international committees and task forces.

Technology Development & Appraisal Section

This Section commenced work on a major new study -- the Nanticoke Environmental Management Program (NEMP). NEMP is a joint undertaking of the Ministry of the Environment, Ontario Hydro, Environment Canada, Texaco, and Stelco. A program co-ordinator and a project scientist were hired, and technical and management committees, with each partner represented, were formed. Air monitoring equipment for gases, particulate matter, and precipitation was acquired. When the network is fully operational, Nanticoke will be one of the most thoroughly and intensively monitored areas in the world.

The Sudbury Environmental Study continued with increasing emphasis on air pollution aspects. A wet-only precipitation network was installed and operated. Other atmospheric aspects included SO_2-to-sulphate oxidation-rate studies, meteorological measurements, measurement of pollutant emissions, air mass trajectory analysis and model development (jointly with the Air Quality and Meteorology Section).

Co-ordination of various components of the Ministry's Hazardous Contaminants Program improved through the operation of the Hazardous Substances Committee and the creation of the following four working groups: Source Inventory, Organics, Inorganics, and Radioactivity. These working groups are composed of staff from various Ministry branches. Significant progress was achieved in a number of program aspects, including: ambient air surveys for PAHs, PCBs, alkyl benzenes, and chlorinated hydrocarbons; completion of a survey of potential sources of PAHs; the preparation of comprehensive background reports on the environmental aspects of chlorinated and aromatic hydrocarbons and radioactive substances.

The Research Grants Program provided grants in aid of atmospheric pollution research to 19 principal investigators from universities across the Province. The grantees presented their findings at a series of public seminars held in February and drew enthusiastic response from government agencies, crown corporations, universities, and industry.

Two committees played lead roles in dealing with malodour problems from automobile painting operations and restaurants. Work included emission measurements and evaluations of various methodologies and technologies of malodour control.

The Section continued work on the evaluation of new control technologies (wet scrubbers and incineration) for controlling particulate and gaseous emissions.

Mobile ambient air monitoring, in support of various Ministry air pollution control programs, was carried out at many locations throughout the Province including Nanticoke, Mississauga, Sarnia, Petrolia, Marathon, Terrace Bay, Thunder Bay, Red Rock, and Sudbury. The surveys monitored SO_2, particulate matter, sulphates, nitrates, PCBs, total hydrocarbons, various trace metals, ammonia, NO_x, O_3, and H_2S.

Work continued on source-testing procedures for upcoming refuse burns at Canada Cement LaFarge and the Lakeview Generating Station.

In 1977-78, the Section witnessed/evaluated 67 source tests conducted across the Province. Source tests for malodorous emissions from restaurants and automobile painting operations were also conducted, and source surveys were co-ordinated or carried out for toluene diisocyante, PCBs, PAHs, and emissions from the INCO superstack in Sudbury.

Vehicle Emissions Section

In 1977-78, this Section performed 4,653 inspections at its Castlefield Avenue Test Centre. Of these, 166 (3.6 per cent) inspections turned up disconnected or missing pollution control equipment. Elsewhere in Toronto, 3,980 inspections at 11 sites resulted in 233 defective vehicles (5.9 per cent) being found. Test staff also visited 13 municipalities during the summer of 1977 and tested 2,755 vehicles of which 133 (4.8 per cent) had defective pollution control equipment. Visits to Sault Ste. Marie and Kenora were made to participate in "Conservation Week" activities.

As a result of the testing program, the Ministry brought 41 charges against vehicle owners. Of this number, 34 cases resulted in guilty verdicts; four cases were dismissed; three cases were still pending at year-end.

Inspectors visited 207 automotive dealerships to inspect on-sale cars for compliance with Section 23 of The Environmental Protection Act. Altogether, 1,231 cars were checked and 138 Violation Notices issued. It was only necessary to charge four dealerships for failure to comply with the Notices.

The Section's two diesel inspectors, working with Ontario Provincial Police (OPP) patrols, stopped 510 trucks because of smoke emissions. As a result, 159 warnings were issued and 351 charges were processed by the OPP under Section 49(2) of The Highway Traffic Act. Of this number, 256 cases resulted in guilty verdicts; 19 cases were dismissed; 76 cases were still pending at year-end.

Inspectors made 24 visits to community colleges and schools to explain the provisions of The Environmental Protection Act, the operation of the Vehicle Emissions Section, and how the Ministry's legislation affects the work of motor vehicle mechanics.

water resources branch

Director: G.H. Mills

The Water Resources Branch collects and interprets information on water resources and provides water management, engineering, and scientific services to municipalities, consultants, conservation authorities, and other ministries. Activities directed toward the detection and prevention of contamination of lakes, streams, and ground-

water, and the dissemination of information on trace contaminants in fish, strengthen the Ministry's role in safeguarding water resources for multiple uses.

Great Lakes

As part of the review of the Canada-United States Agreement on Great Lakes Water Quality, major issues considered were water quality objectives; surveillance and control of hazardous substances; pollution from shipping, dredging, point sources and land use activities; and public perception of Great Lakes water quality.

The Ministry and the federal government recognize the importance of a strong surveillance program to monitor the clean-up of the Great Lakes. In the Canada-Ontario Agreement, the federal government has agreed to pay a maximum of $762,500 in matching funds to the Province to assist in the surveillance of the Great Lakes.

Studies completed in Thunder Bay in 1977 indicate a greater extent of bacterial contamination and oxygen depletion than previously observed. An evaluation of total phosphorus trends between 1970 and 1977 shows the amount of phosphorus in the nearshore zone not to have increased significantly over this period.

Preliminary findings of 1977 studies in the St. Mary's River indicate water quality conditions in the river to be similar to those determined in previous years. Improvements in river water quality are anticipated in 1978 because of major abatement measures implemented at the end of 1977.

Data from a short-term survey of Batchawana Bay on Lake Superior during 1977 did not substantiate earlier findings of bacterial contamination and nutrient enrichment. Bacterial levels are well within Ministry criteria for recreational uses.

Radium 226 levels above the MOE drinking water criterion of 3 pCi/l still persisted in 1977 in the inner portion of Serpent Harbour. Two surveys in 1977 indicated acidification problems in the inner harbour up to four km from the river mouth.

Phosphorus data for Collingwood Harbour in 1977 indicate the harbour is still over-enriched.

During 1977, the Branch undertook special testing to increase the analytical sensitivity of the measurement technique for hydrogen sulphide in the site for Bruce Nuclear Power development. Large volume samples and on-site analysis of water adjacent to the combined cooling water discharges at Douglas Point Generating Station and Bruce 'A' heavy water plant did not indicate the presence of hydrogen sulphide to a detection limit of approximately 2 to 5 ug/l.

Water quality investigations carried out in the St. Clair River indicated a downward trend in mercury levels in fish and sediment over the seven-year period 1970-76. The mercury content in Lake St. Clair fish is now one-half of what it was in 1970. This dramatic decline is attributed to the reduction of industrial mercury discharges as a result of ministerial control orders and the translocation of mercury from the St. Clair River system to Lake Erie. Water quality investigations in the Detroit River revealed reductions of bacterial levels along the Ontario shoreline of the river.

Some improvements have been noted in recent years in the Canadian coastal waters of Lake Erie. In the western basin, total phosphorus levels have declined; phytoplankton biomass has decreased at the Kingsville intake monitoring site; chlorophyll a levels appear to have declined. In the eastern basin, there appears to be no significant change in water quality with time. The water quality at the Grand River mouth is still degraded as a result of tributary nutrient and dissolved solids loadings.

A detailed evaluation of mercury levels in fish and sediment in the western basin of Lake Erie has been completed. This assessment concluded that mercury levels in walleye and white bass in the western basin of Lake Erie have declined significantly since controls on industrial mercury losses were implemented in 1970. Mean concentrations of mercury in the western basin sediments have not appreciably decreased; however, some redistribution of more heavily laden sediments has occurred.

Since 1969, water quality in the nearshore area of Lake Erie at Nanticoke has been under surveillance. The surveys provide background data for the region where considerable industrial development is under way. Analysis of data acquired so far shows that only minor long-term changes can be detected for several of the parameters. The water quality is similar throughout the area, with seasonal changes occurring each year.

Water quality surveys covering the effects of artificial mixing by aeration in Hamilton Harbour showed the smallest temperature-gradient-with-depth yet recorded during three years of artificial mixing. Dissolved oxygen again improved in deeper harbour waters and remained normal in surface waters. However, spring ammonia concentrations were higher than in 1976; and total phosphorus was higher in the northeast corner of the harbour. Sources and sinks of oxygen were studied. Sediments utilized 13-23 per cent of the total oxygen supplied to the harbour. Important sources of oxygen are atmospheric reaeration (68-84 per cent) and lake-harbour exchange which supplies about 20 per cent of oxygen during the critical summer period. It was found that both sediment oxygen demand and water column oxygen demand rise with increasing temperature and dissolved oxygen concentration. It was apparent that artificial mixing increased the rates at which wastes became stabilized.

Bacteriological trends for Toronto beaches were updated in 1977. Liaison, information exchange, and comment with regard to local municipal planning activities are carried out on an ongoing basis. High nutrient loading, poor bacteriological water quality and sediment contamination continue to be the major issues in Toronto Harbour.

Recording meter data, representing major waste inputs and water exhanges with Lake Ontario, were applied directly to the numerical model of currents and water quality at ten-minute intervals. The model output was verified by comparison with recording meter data from an independent location and showed circulation patterns and movement of dissolved compounds varied with wind directions and storm events. Major inflow to the harbour is through the western gap; outflows are mainly through the Hearn generating station and the eastern gap.

Low dissolved oxygen levels in the Bay of Quinte and Adolphus Reach area continue to be a problem. Phosphorus levels continue to be high in the Bay of Quinte, particularly in the upper bay.

Pollution From Land Use Activities Reference Group (PLUARG)

Input to the Pollution from Land Use Activities Reference Group (PLUARG) study under the International Joint Commission was completed. Principal findings of Ministry studies in the Grand River and Saugeen River "pilot watersheds" are contained in two summary reports submitted to PLUARG.

Major sources of pollutant loadings are as follows:

Urban	- metals, organic chemicals, bacteria, phosphorus
Point-sources	- metals, organic chemicals, phosphorus, nitrogen

Transportation	- lead, chloride
Private-waste Disposal	- phosphorus
Agriculture	- sediment, phosphorus, nitrogen

Pollutant rankings suggest that urban runoff, relative to drainage from agriculture and wooded land, yields greater unit-area loads of total phosphorus, sediment, chloride, and metals. The rankings also suggest that agricultural runoff compared to urban and wooded areas is the major contributor of nitrogen and filtered reactive phosphate in both pilot watersheds.

In addition to significant inputs of phosphorus from agricultural activities and private-waste disposal systems, increased levels of nitrogen creating localized ground-water problems may also occur as a result of these land uses and practices in the basin. Properly constructed private-waste disposal systems are of minor concern.

Highway de-icing agents are identified as being the major contributor of the chloride at the mouths of the Grand River and Saugeen River. The chloride load due to de-icing agents is estimated to be in the order of 40 to 60 per cent of the total load at the mouths.

Minimal impacts on stream water quality have been monitored from waste disposal practices such as sanitary landfills, processed organic waste disposal, and spray irrigation. This is, in part, due to the limited areal extent of these land uses and practices in the "pilot watersheds". Increased land usage of these practices could create an ultimate environmental concern if proper design and management of the sites are not observed. Generally, the major concern is with respect to possible contamination of ground-water by pollutants such as nitrate, phenoloc compounds, industrial chemicals, pesticides, and other chemicals that may be present in the waste.

Monitoring data suggest that the mining of aggregates for the construction industry (sand, gravel, crushed stone, lime, etc.) does not affect receiving stream water quality provided some method of wastewater treatment such as settling ponds is used.

The results indicate that the bulk of the river loads (from 80 to 95 per cent in the Grand and Saugeen rivers, respectively) are transported during the months of February, March, April, and May. Heavy metals, pesticides, and organic chemicals have a strong affinity for the clay-size sediment fraction which is transported as suspended material in the water.

In order to assess the impact of watershed loadings of contaminants on the biota, body-burden levels for fish, benthos, plankton, and water were determined at selected sites on Lakes St. Clair, Erie, Ontario, and Georgian Bay. Contaminant partitioning in various components of the stream and biota were observed at Grand River and Oakville Creek in 1976 by utilizing samples of emerald shiners, amphipods, plankton, and river water. While river water concentrations of contaminants were similar at both sites, significantly higher organochlorine contaminant levels were found in the biota from the Oakville Creek delta.

Aquatic Weeds

The Branch published two reports summarizing the results of research and feasibility studies on aquatic weed harvesting completed in 1976-77. In 1977-78, aquatic plant harvesting was continued in the Kawartha Lakes under Ministry supervision, and 860 acres were harvested.

Some 50 lakes were surveyed across Ontario to define the extent of invasion of problem weed species (Eurasian Watermilfoil) and to establish environmental factors controlling their distribution. Surveys were carried out throughout the Trent System and in part of the Rideau System.

Sudbury Environmental Study

With the aid of in-situ rainbow trout bioassays, it was shown that the heavy metals in Middle and Lohi Lakes remained at concentrations toxic to fish even after the pH had been brought back to normal. Fertilization experiments were continued to improve understanding of metal-acid-nutrient-biota interactions within Middle Lake near Sudbury.

Alkalinity in "reclaimed" lakes has been slowly dropping, and at least one lake became acidic again. Intensive surveys continued to define inputs from runoff and the atmosphere to explain the loss of alkalinity. Long-term monitoring of acidified and metal-contaminated Clearwater Lake was continued.

Lakeshore Capacity Study

The Lakeshore Capacity Study is a co-operative venture sponsored by the Ministry of Housing and involving the Ministry of the Environment and the Ministry of Natural Resources.

At year-end the Study was midway through the field work designed to quantify the effects of cottage development on lake water quality. The study is providing much of the relevant acidic precipitation data in Ontario. Atmospheric ion-loadings to the lakes have been calculated in addition to the loss of phosphorus and nitrogen from them. Both parameters are required for the construction of lake mass balance budgets and models to quantify the effects of man's activities.

Urban Area Lakes

Gravenhurst Bay continued to show improvement in water quality; both total phosphorus and total nitrogen were lower in 1977. Secchi disc depths were slightly higher than those observed in 1975.

Branch staff completed the first year of a study of two man-made lakes fed strictly by stormwater runnoff. The lakes -- Aquitaine and Wabukayne -- are located in Mississauga. The larger lake, Aquataine, has a more sophisticated sedimentation pond which proved very effective. Extremely clear water prevailed in the late summer with Secchi disc depths as deep as 3.5 m. The developer added 3,300 rainbow trout to Lake Aquataine in late September.

Water quality in the area of Midland and Penetanguishene on Georgian Bay has not shown the improvement expected. In Penetang Bay, water quality results were similar to those obtained in 1974.

Destratification efforts were continued in Heart Lake. Although a massive algal bloom developed during the summer months, as usual, it was not of the same species as in 1976, and no fish kill occurred.

Trace Contaminants

As this Province's "spokesman" for trace contaminants such as mercury, polychlorinated biphenyl, mirex, and DDT, the Ministry of the Environment issued 12 bulletins on contaminants in fish for about 200 watercourses throughout Ontario. The Environmental Health Bulletins are based on fish samples collected primarily by staff of the Ministry of Natural Resources and analyzed by the MOE laboratory. Medical advice is provided by staff of the Ministry of Labour. Water Resources Branch staff evaluate the laboratory results, prepare the basic environmental health bulletins, and co-ordinate trace contami-

nants information distribution. In addition, Branch staff co-ordinate the planning of the yearly fish monitoring program and participate in the planning and, in some cases, the implementation of special studies.

The Branch initiated the Lake Simcoe mercury study early in 1977 to identify possible sources of mercury and their magnitude and significance in light of elevated mercury levels measured in large walleye (pickerel) taken from the lake. Field work was completed in the winter of 1977-78, and a final report was scheduled for the spring of 1978.

Branch staff also began an environmental study of the significance and impact of mercury used on golf courses. Field studies were conducted in the late fall at two golf courses that use mercurial compounds to control fungi (snow mould). Similar studies were to be carried out during the spring runoff period and a report prepared.

A special fish monitoring program, involving young-of-the-year minnows (spottail shiner) in nearshore areas of the Great Lakes and yearling perch in inland watercourses, continued during 1977-78. The program has proven valuable in determining and evaluating comtamination in localized areas by chlorinated hydrocarbon compounds (PCBs, pesticides, etc.). Information was obtained for 25 locations on the Great Lakes and 13 locations on inland lakes.

Branch staff participated on the Inter-ministerial Committee on Mercury. This Committee developed comprehensive publications to guide anglers on safe consumption levels for various species of fish from lakes throughout Ontario. The information packages were published in July 1977. Updated publications will be prepared each year to incorporate new results. The 1978 version was scheduled for release at the end of April 1978.

Water Management

The Branch completed extensive review and revision on the publication "Guidelines and Criteria for Water Quality Management in Ontario". The revisions include: a broadening of the scope of the document to cover surface and ground-water quality and quantity management; the establishment of statements of goals, policies, and implementation procedures for each of these four areas; and an updating of the receiving water criteria. The proposed revisions were distributed for review and approval.

The Permit To Take Water Program, administered under Section 37 of The Ontario Water Resources Act was reviewed and updated to provide a better and more efficient service to the public. The development of an automated storage and retrieval system for water-taking information marks a significant step forward in handling large volumes of permit data rapidly and efficiently. The system was tested on a pilot basis during 1977 and planning the implementation of the Water Taking Information System on a Province-wide basis will be undertaken in 1978.

Surveillance of the water-well drilling industry continued with the issuing of 484 licenses to drilling and boring contractors during 1977, with 32 of these being to contractors licensed for the first time. Three drillers were prosecuted during 1977, one license was cancelled and one license placed in temporary suspension for infractions under Section 40 of The Ontario Water Resources Act. Several training seminars were arranged and presented to regional staff from this Ministry and the Ministry of Health as part of a continuing upgrading program for drilling industry surveillance. A two-day water-well drilling conference was sponsored at our Toronto laboratory with special emphasis placed on driller training, certification, and drilling safety. A total of 121 attended this conference; an increase of 20 per cent over attendance at the last conference in 1975.

Water Resources Inventories

The water resources study of the South Nation River basin was completed. Results of the South Nation River basin study indicate that the water resources of this basin are major limiting factors to development. An inter-ministerial proposal for water-resources management in the South Nation River basin has been put forward by the Ministry of the Environment, the Ministry of Natural Resources, and the Ministry of Agriculture and Food.

The ground-water mapping projects, historically involving only probability maps on a county basis, were expanded in 1976 to include: (1) the mapping of flowing wells in the Province and (2) the delineation of major aquifers that may provide significant water-supply potentials. The ground-water probability maps are layman-oriented and are designed primarily for domestic users who require small quantities of water. The ground-water probability map for the County of Brant was published and mapping was completed for the regional municipalities of Peel and Haldimand-Norfolk. Mapping is in progress for the County of Simcoe. The mapping of flowing wells is designed to aid in the conservation of ground-water by requiring that water-well drillers take precautionary measures in such areas to control flows. Mapping was completed this year for the southern part of the Province and the results have been made available primarily to water-well drillers. Maps for the rest of the Province will be completed and released in 1978. In the major aquifer series, which identifies and delineates major sources of ground-water for large-scale development needs in the Province, the Alliston Aquifer Complex map was published. Mapping was completed for the Oak Ridge Aquifer Complex and the Gulph-Amabel Aquifer which extends from the Niagara Peninsula to the Owen Sound area.

Three publications, "Water Well Records for Ontario", Bulletins 2-18, 2-19, and 2-20, were released, showing ground-water and geologic data covering eight counties in Southern Ontario. Bulletin 2-101, "Data for Observation Wells in Ontario, 1974", which presents data on ground-water levels in the Province of Ontario, was released. Four publications, providing basic information on the Province's streamflow and inland water quality, were released: "Selected Streamflow Data, Ontario, - Bulletin 3-11, 1976", "Lowflow Characteristics of Streams in Southeastern Ontario, - Map 3005-3", and "Water Quality Data for Ontario Lakes and Streams, - Volume IX, 1974 and Volume X, 1975".

The Branch prepared a summary of 1976-77 pesticides and metals data for all significant streams tributary to the Canadian side of the Lower Great Lakes in support of Task 'D' activities under the PLUARG study. Total phosphorus tributary loading information was provided to the International Joint Commission (IJC) for all significant tributaries to the Great Lakes for the period 1967-74, as well as the 1976-77 data. Detroit River tributary loads for the period 1976-77 were provided to the Michigan Department of Natural Resources as input to the Surveillance Subcommittee Report on the Detroit River.

Grand River Basin Water Management Study

The Branch continued water resources survey activities in the Grand River during 1977-78. This was the third year of intensive investigations of the environmental impact of sewage treatment plants. During the summer of 1977, surveys downstream from six sewage treatment plants on the Nith River, Canagagigue Creek, and the Upper Grand River were completed. These studies, along with investigations of the larger sewage treatment plants in the central and lower basin in former years, complete this component of the Grand River study.

Robot or automated monitoring stations, in conjunction with routine year-round sampling, measured and recorded water quality at key locations throughout the basin. Biological field work was carried out at selected reaches of the river as part of the ongoing study of the relationship between nutrient input, biomass production, and daily dissolved oxygen fluctuations. Hydrologic studies, conducted in conjunction with the Ministry of Natural Resources and the Grand River Conservation Authority, continued with the evaluation, implementation, and testing of computer models for streamflow generation and reservoir operation.

During the summer of 1977, plans were approved and funding provided for a much more extensive study of water resource management of the Grand River basin to be completed by September 1980. During the late fall and winter months, new and expanded programs were developed and scientists, engineers, and technicians were engaged to implement the programs. The ground-water inventory study was initiated. Urban runoff models were applied to areas in the City of Guelph and tested for future use in determining the effects of urban stormwater runoff in the basin. In March 1978, a full-time study co-ordinator was hired.

The broad objective of the study is to develop a multi-use waste management plan for the basin involving consideration of all beneficial water uses; protection of water quality; maintenance of water supply, recreational uses, and flood protection. The Grand River Implementation Committee is directing the study. The Committee is composed of representatives from several ministries (Natural Resources, Housing, TEIGA, Agriculture and Food, Environment) and the Grand River Conservation Authority. A member of the Water Resources Branch chairs the Committee.

Cartography and Drafting Services

Cartographic, drafting, graphic design, and reproduction services were provided in support of Ministry programs. Requests for such services increased by 16 per cent over the previous year. Staff completed 330 multicolor and monocolor maps and produced 1,540 technical drawings, graphic artworks, and illustrations.

Engineering and Scientific Services

Work toward reducing the incidents of ground-water contamination in Ontario continued in the area of solid waste disposal, salt contamination, and underground petroleum storage. Staff input was provided in developing the Ministry's position on a number of disposal sites including those proposed at Maple, Brock Road North, and Ottawa-Carleton, and the proposed disposal facility for nuclear wastes at Port Granby. A problem with landfill gas at the Kitchener-Waterloo landfill was addressed at the request of the district office, and expert testimony was provided for the Ministry at the Environmental Assessment Board's hearings on the proposed industrial-waste disposal facility at Nanticoke. Consultation was continued with the Ministry's Committee on Amendments to the Regulations re Waste Management. Membership on the MTC-MOE Contamination Committee continued, and assistance was provided to the regions and the Ministry of Transportation and Communications in resolving particularly difficult ground-water contamination problems associated with storage facilities for de-icing materials.

The Branch is represented on the ad-hoc Committee on Leaks and Spills of Petroleum Products which was formalized in 1977. The most recent efforts of this Committee have been directed toward establishing a co-ordinated approach to field investigations of contamination incidents by staff of the Ministries of Consumer and Commercial Relations and Environment.

The soils laboratory continued to conduct a variety of analyses on soil samples submitted from various sources within the Ministry, in support of the PLUARG study, drainage basin inventory studies, ground-water development projects, and studies undertaken as part of the regional approvals function for sanitary landfill sites.

Geophysical surveys involving seismic, resistivity, well-logging, and VLF (very low frequency) resistivity methods were utlitized in ground-water contamination problems. Specialized assistance was also provided to the Ministry of Transportation and Communications and the University of Waterloo.

Field studies continued for a second year on the extent and significance of residual chlorine levels in streams, and a paper summarizing the study findings was presented at a chlorination conference.

Staff specialists with expertise in evaluating the aquatic environmental impacts of marine construction, hydro projects, and radioactive pollutants provided technical assistance to MOE regional and head office staff as well as other ministries and agencies. Projects involving such staff included: major landfills along the Lake Ontario shoreline; Ontario Hydro's proposed Darlington and Atikokan Generating Stations; radon contamination in basements and deep wells.

Phytoplankton and zooplankton analyses supported a wide variety of regional programs. Over 100 written reports were sent out in answer to specific questions or problems, and data were collected from 135 lakes in co-operation with regional staff.

Three Ministry reports and four journal papers were published which summarized findings relative to Ontario's phosphorus control program, aspects of phytoplankton methodology, and descriptions of new species.

Industrial effluents are tested for acute toxicity to fish in support of abatement programs. Approximately 77 industries were tested in 1977-78. These data are forwarded also to Environment Canada. The 1978-79 effort is to concentrate on the steel industry. A Branch member serves on the Technical Co-ordinating Committee in order to participate in federal test standardization and development of future regulatory requirements.

Sublethal tests, such as tainting of fish flesh, were also carried out in support of abatement measures. Most of this effort dealt with industries in the Sarnia area. The most prevalent chemicals identified during this study are to be examined to determine their bio-accumulative potential.

The Branch assisted regional staff in conducting intensive surveys to define the effect of waste effluent discharges on stream quality and applying water quality models to set effluent waste loading guidelines for pulp and paper mills and mining process operations in the northeastern and northwestern regions. Similar tasks were undertaken for the southern regions in defining discharge guidelines for proposed changes or additions to existing sewage treatment plant facilities, and in applying Ministry guidelines and criteria for stormwater management in new urban development areas. The second Annual Seminar on Water Resources Assessment was held to discuss such problems with regional staff.

The Branch advised Legal Services and regional offices on the dispersion and movement of contaminants in Lake Erie in connection with a proposed industrial-waste disposal facility and a proposed industrial outfall at Nanticoke. Staff served as consultants to UNESCO on the Tejo Estuary Water Quality Study in Portugal and in developing a manual on self-purification processes in lakes.

Participation in the activities of the Urban Drainage Subcommittee under the Canada-Ontario Agreement continued. Supervision of external data collection and design projects was completed to demonstrate the use of stormwater management models in defining pollution loadings from separate and combined sewer overflows. Active roles were also provided in the development of the Urban Drainage Practice Manual and the Manual of Urban Stormwater Management policies.

pollution control branch

Director: K.E. Symons

The Pollution Control Branch is primarily responsible for the planning of environmental control programs and development of associated legislation, regulations, and guidelines to control the emission of contaminants. Supplementary functions include applied research, technology transfer, technical advisory service, and delivery of certain aspects of the pesticides and noise control programs.

During the year, the training and certification and safety programs were transferred to the Branch.

Municipal and Private Section

This Section is responsible for policy development and program audit in connection with municipal water supply and pollution control, private sewage, and solid waste management systems.

Municipal Water Unit

The Municipal Water Unit developed and circulated a draft policy and guidelines relating to the location of sewers and watermains to 60 municipalities for comment prior to finalization. Major support was provided in the preparation of a manual on cross-connection control. These documents are intended to guide municipalities in the installation of sewers and watermains and to minimize the potential for contamination of water systems.

Revisions to the Chlorination Bulletin were still in progress at year-end. A questionnaire on disinfection practices prepared jointly by the Ministry and the Ontario Section of the American Water Works Association was distributed for comment and the Unit was collating the data prior to preparation of a report.

The Unit continues to serve on the MOE/Ministry of Health Committee on household water treatment devices. A guideline on ultra-violet disinfection was completed and a draft guideline for iodine disinfection prepared for discussion.

Municipal Sewage Unit

The Municipal Sewage Unit completed draft guidelines for the inspection of digester gas systems in existing sewage treatment plants to ensure their safe operation. A complete listing of all water and sewage works in Ontario was issued and is to be updated annually. The annual "Operating Summaries" for 1976 covering Ministry-operated water and sewage facilities were published. Policies and guidelines on "Energy Conservation in Sewage Treatment", "Land Application of Sewage Plant Effluents", and "Disinfection of Wastewater" were in preparation at year-end.

Under the Municipal Infrastructure Agreement between Central Mortgage and Housing Corporation and the Ministry of the Environment, a five-year (1977-1981) Province-wide capital budget forecast for water and sewage facilities was produced. Based on the forecast, Central Mortgage & Housing Corporation financing for sewage and water works construction in Ontario for 1977 was negotiated to be $106.9 million in loans, $13.5 million in grants, and $7.6 million in high-cost construction grants. However, due to financial constraints exercised by the federal government, the loan commitments were subsequently cut back to $92.3 million.

During the year, 11 new sewage treatment plants and nine new water treatment plants were put into service. A total of 343 sewage works were in operation in Ontario at year-end with a total design capacity of 1.1 billion Imperial gallons per day. In addition, 467 water works were operating in the Province at year-end with a total design capacity of 2 billion Imperial gallons per day.

Under the International Joint Commission on Great Lakes Water Quality, the Municipal Sewage Unit is also responsible for administering and co-ordinating the Ministry's activities pertaining to research and program implementation under the Canada-Ontario Agreement (COA) with the exception of the surveillance program. One of the more significant programs under COA has been provision for phosphorus removal at all significant municipal discharges. This program was completed in 1976-77. At year-end, over 210 sewage treatment plants, representing 85 per cent of the total hydraulic capacity of all sewage plants in the Province, were undertaking phosphorus removal.

The Unit concentrated considerable effort on urban drainage management and sewage sludge utilization on agricultural lands. A manual of "Urban Drainage Practices" was prepared by an Inter-Governmental Working Committee outlining the ramifications and practices of innovative urban drainage concepts and providing methodologies for their adoption and implementation. A draft policy and guidelines package on urban drainage management was under development at year-end. Draft guidelines for the utilization of sewage sludge on agricultural lands were finalized by an Inter-ministerial Committee representing the Ministries of Agriculture and Food, Environment, and Health.

The Unit co-ordinates the development and operation of a Management Information System. In conjunction with the Systems Development Section of the Administrative Services Branch, work was completed on the development and testing of the Utility Water Pollution Monitoring File which can store and accumulate water and sewage treatment plant operating data and produce comprehensive summaries on the performance efficiencies, loadings, costs, and capabilities of all municipal sewage and water treatment facilities. Input of data to the file was begun for Ministry-operated utilities; the file will ultimately be extended to cover all utilities across the Province.

Private Sewage Unit

The Private Sewage Unit prepared amendments to the sewage system regulations. In addition, Notices were issued to all regional municipalities, health units, and Ministry field offices on matters related to the program. The Notices provided policy statements on such varied subjects as land inspection, equipment acceptance, and financial arrangements with implementing agencies.

Solid Waste Unit*

The Solid Waste Unit co-ordinated the Derelict Motor Vehicle Clean-Up Program in 20 new municipalities in addition to the 16 carry-over contracts from 1976-77. These projects were mostly located in the northern

regions of Ontario. Revenue from the sale of vehicle hulks remained with the municipalities to further their clean-up efforts. During the year, 14,139 hulks were located, of which 11,630 were released by the owners, and 9,430 were delivered to certified derelict motor vehicle sites. The hulks are returned to steel mills through scrap metal dealers.

The Waste Management Improvement Program, under Derelict Motor Vehicle funding, was initiated in the spring of 1977. Contracts were entered into with 143 municipalities throughout Ontario whereby funds were provided for:

(1) upgrading existing landfills to meet MOE standards;
(2) properly closing waste disposal sites;
(3) the development of new waste disposal sites;
(4) debris clean-up of recreational areas.

The contracts were basically labor-oriented and required 60 per cent of total costs to be applied to job creation.

In March 1978, Regulation 687/76 was amended by Regulation 157/78 to complete the Province's control program on non-refillable beverage containers. This permits the continued use of non-refillable glass containers in 200 ml, 750 ml, and 1.5 litre sizes. The display space for refillables and non-refillables is specified in order to ensure at least equal area for refillable containers. The promised voluntary co-operation by industry to achieve 75 per cent refillable container use by December 31, 1979, will achieve the same environmental goals as established in the original program approach.

A review of Regulation 824 is being carried out in order to streamline the approval process, improve the operation and control of landfill sites, and provide more flexibility in waste management decisions.

The Pathological Waste Implementation Task Force was established to develop an economically-viable and environmentally-sound plan for managing pathological waste in the Province. The Task Force was, at year-end, developing guidelines for the collection, storage, transportation, and disposal of these wastes.

Industrial Section*

This Section continued to develop guidelines and technical reports for pollution control in the industrial sector and provide technical support to the Ministry's regional operations.

All existing mining guidelines were reviewed, revised, and incorporated into a single document entitled, "Guidelines for Environmental Control in the Ontario Mineral Industry". The guidelines were extended to include control levels for ammonia, cyanide, arsenic, and phosphorus.

Work was completed on a status report entitled, "Active Mining Operations in The Province of Ontario". The report is to be published in 1978-79.

The experimental solidification plant for the treatment of liquid industrial wastes established at the Ottawa Street landfill site in Hamilton operated successfully during 1977-78. Data gathered from the operation should enable the company to apply for formal approval to operate the process at a permanent location.

The new way-bill regulation (Ontario Regulation 926/76) functioned reasonably well during the year, and much useful information was obtained from the returns. A number of automated systems for mechanical handling of the data extracted from the returns were investigated, and a system was selected which should considerably

improve the efficiency of data-handling and the control function of the Regulation. Revisions to the reporting forms were undertaken to make them more compatible with the automated data handling system.

Funding was received in 1977-78 from the Provincial Lottery Corporation for a project involving the rehabilitation of derelict mining lands across Ontario.

During the year, 642 inactive and abandoned mining properties in Ontario were documented, of which 160 were visited. During this period, 110 mineral tailings samples were taken and analyzed for 33 parameters while an associated 177 vegetation samples were analyzed for 21 parameters. All data is to be presented in a report to be published in 1978-79.

The Section continued co-ordination of the general PCB pollution abatement program. The destruction of PCBs at St. Lawrence Cement was subject to review at a public meeting in Mississauga, and this issue is to be presented for consideration by the Environmental Assessment Board in 1978-79.

The Section commenced a Provincial Lottery-funded project to assess the environmental impact of using waste oil as a dust suppressant on rural roads. Phase I of the study was completed by year-end; Phase II is to be continued in 1978-79.

Guidelines respecting environmental emergency procedures, pollution prevention measures at chemical storage facilities, and PCB pollution prevention and waste management were initiated in 1977-78 and are expected to be issued in 1978-79.

Phase II of a Consultant's study on the potential utilization of wood wastes in the Hearst Area was completed. This phase was a detailed financial and engineering evaluation of the feasibility of constructing an energy complex generating steam and electricity. The final report is expected in mid-1978.

An Inter-ministerial Committee, established to find solutions to the whey disposal problem at small cheese factories in Eastern Ontario, was unsuccessful in attracting any interest on the part of the private sector to build a central whey-drying facility. Several alternatives, specific to individual small cheese plants, were being reviewed at year-end to determine whether such solutions to the whey disposal problem are feasible.

Noise Pollution Control Section

This Section received 368 new noise complaints in 1977-78 while the City of Toronto received 778 noise complaints.

Five municipalities adopted noise control bylaws which, pursuant to the legislation, were approved by the Minister of the Environment. Of these, the bylaws of North Bay, Barrie, and Guelph were printed for general distribution and information.

The third year of the Environmental Acoustics Technology training program was completed. More than 100 candidates received instruction in noise control and in noise abatement techniques in land use planning. Four of the Ministry training manuals in the series were revised and reprinted to meet public demand.

The Noise Pollution Control Section provided technical analysis and comment on 410 new land use projects including new subdivisions and changes in official plans. It also analyzed potential noise impacts on 40 new industrial projects submitted to the Ministry for approval.

A railway noise symposium co-sponsored by CP Rail and the Ministry was held in Toronto in May 1977 to discuss environmental and land use problems arising from

noisy railway activities. Many federal and provincial agencies concerned with the issue attended and contributed to the symposium. A comprehenisve report on the symposium and background documents was later circulated to all participants.

Two noise-related projects were funded by the Ministry under the Experience '77 program, and considerable data was gathered by students working under professional supervision. In addition, work continued on four major in-house projects related to aircraft noise, freeway noise, impulsive noise, and truck noise. A number of interim reports were prepared for distribution and comment.

Pesticides Control Section

This Section promotes a balance between pesticide use and environmental protection. Its prime responsibility is to ensure the safe use and management of pesticides in Ontario through licensing of exterminators and vendors, issuances of permits for use, public education programs, and industrial and commercial education with training courses, fact sheets, and study guides.

The Section carries out its programs under The Pesticides Act, 1973 and Ontario Regulation 618/74.

Mosquito Control Program

The summer of 1977 was the second consecutive one in which municipalities south of a line drawn between Sarnia and Toronto were urged to participate in mosquito abatement programs. This part of the Province was designated a high-risk area after 67 cases of St. Louis encephalitis were reported during the fall of 1975.

The Section continued its mosquito identification service to determine where different breeds were located and when larvicides should be applied to the water. In addition, 50 mosquito light traps were placed throughout the southern portion of the Province to determine the activity and abundance of the potentially-hazardous species.

Due mainly to dry weather, mosquito populations were reduced during 1977-78. Fortunately, there were no human cases of encephalitis during this time.

Termite Control Program

This program is directed toward providing technical and financial assistance to municipalities experiencing problems with termites. Public education is a big part of the program.

Surveys were being carried out at year-end in all boroughs of Metro Toronto as well as ten other communities in the Province. The Section conducted a termite survey using wooden bait blocks. Last year, 12,000 of these blocks were examined, and various degrees of activity found. The blocks were found to be good indicators of whether or not termites were infesting an immediate area.

Following is a list of termite control grants

Municipalities	Chemical	Structural
Township of Gosfield South	1,740.00	-
Town of Kincardine	23,089.20	4,640.25
Town of Leamington	15,777.00	-
Village of Elora	4,476.40	180.00
City of Guelph	204.00	1,796.00
Borough of East York	9,328.80	3,914.00
Town of Markham	225.00	-
Borough of Scarborough	5,809.92	2,396.00
City of Toronto	32,607.18	21,352.17
Sub-Totals	93,257.50	34,278.42
Total	$127,535.92	

Grants in the amount of $127,535 were approved. Two hundred and fifty-three treatments were successfully completed. Homeowner grants amounted to $105,287.

Licensing

Licensing involves providing appropriate study material, examining applicants, and licensing qualified applicants to apply, store, or sell pesticides. The Section is also involved with the licensing of termite and mosquito exterminators.

During 1977-78, the Section gave 1,600 examinations and issued approximately 5,300 exterminator, 800 operator, and 3,500 vendor licenses. Also issued were 138 permits for the use of restricted products on land, 459 permits for the application of pesticides to water, and 194 permits for structural extermination.

Research

The Section conducted research in selected water sites throughout the Province to determine the efficacy of a number of unregistered aquatic herbicides for a variety of plant problems.

Contingency Planning Section

The "Province of Ontario Contingency Plan for Spills of Oil and Other Hazardous Materials" and one publication supplementing this manual were revised and updated. The contingency plan organizes the activities of the various governmental agencies which may be involved in a spill incident of major proportions. Agreement in principle was reached to have the Ministry of Labour co-sign the Provincial Plan, bringing the total number of participating agencies to nine.

The Section continued to assist in the development of several contingency plans for municipalities and major corporations. The Section also continued to assist in the development of the "Detroit-St. Clair River Supplement", a detailed response mechanism under the Joint Canada-U.S. Marine Contingency Plan.

The Section participated in several training exercises, seminars, and workshops; of particular interest was a "hands-on" oil spill exercise on the St. Clair River organized by the Canadian Coast Guard. The exercise was centred around a simulated spill of bunker oil from an imaginery oil storage facility in Sarnia and involved the escalating response of industry, municipal, provincial, and federal resources. More than 210 people participated. The Section also helped to prepare a similar exercise held at Parry Sound and one to be held at Thunder Bay in 1978-79.

The Section prepared design criteria for the construction of a retention pond in the City of Peterborough, incorporating facilities to minimize adverse effects of possible oil spills. The retention pond, now in operation, is intended to intercept possible oil spills from a developing industrial sector up-stream from the City's water intake.

A paper entitled "Response to Spills in Ontario" was presented at the 1977 Water Pollution Control Federation Conference in Philadelphia.

Preliminary arrangements were made to include a lecture on the Ministry's spill prevention and response program in courses given by the Fire Marshal's Office at the Ontario Fire Fighters' College in Gravenhurst.

During 1977-78, the Section received spill reports on 527 incidents. Of these, 360 involved the loss of oil; 77, the loss of liquid or solid hazardous materials; 7, gaseous hazardous materials; 83, other contaminants. The average oil spill involved the loss of 1,120 gallons as compared to 910 gallons for 1976-77 and 1,200 gallons for 1975-76.

RESEARCH AND DEVELOPMENT GROUP

Co-ordination and Technology Transfer Section

This Section is primarily responsible for internal and external co-ordination and liaison in matters related to research and for administration of the research facility.

The supervisor is chairman of the Ministry's Research Advisory Committee and maintains liaison with other research groups in the Ontario Government through the Research Administrators' Committee and with the federal government through the Canada-Ontario Agreement. Contact was maintained with the U.S. Environmental Protection Agency (EPA) including the drinking and wastewater research groups in Cincinnati, Ohio. Through membership on the Research Committee of the American Water Works Association, the Section continued to participate in EPA research program selection.

The Section administers the Provincial Lottery Program initiated in 1977. Nine health-related environmental projects with a value of $1.0 million were funded during the year. The projects covered a wide range of subjects including: virus in river water, environmental properties of PCB substitutes, and environmental effects of road oiling. Available funds will be increased to $2.5 million for 1978-79.

Applied Sciences Section

This Section carries out engineering investigations of innovative and unusual concepts with a view to providing information upon which regulations, policies, procedures and/or guidelines may be based. The Section completed eight such studies in 1977-78 resulting in five reports, two papers, and three "Technical Notes". Eight studies were still active at year-end, primarily in the fields of private waste disposal, municipal utility construction in cold climates, and energy conservation.

Wastewater Treatment Section

This Section advances the quality of wastewater treatment in Ontario by maintaining and upgrading the level of expertise in wastewater treatment technology through developmental research and by providing expert advice and assistance to planning, control, and operational staff of the Ministry, as well as to municipalities and private industry.

The Section maintains an analytical laboratory and the Ontario Experimental Facility, a 5.0 MIGD activited sludge plant at Brampton for use in developmental research work and operator training.

At year-end, the Section was involved in ten wastewater treatment research projects dealing with effluent disinfection, ammonia removal, physical/chemical treatment of stormwater, and digester mixing. During the year, four final reports, seven interim reports, and two technical bulletins were prepared. Eight technical papers were presented at conferences, workshops, and seminars.

In an advisory capacity, Section staff made 140 site visits to municipalities and operating treatment facilities after which 85 follow-up memoranda and reports were prepared. Section staff assisted in the preparation and/or review of design proposals for 15 facilities.

Section staff participated in the Activated Sludge Workshop, the Basic Sewage Treatment Course, the Chlorination Workshop, the Digester and Primary Treatment Course, and a new Sampling and Monitoring Course as part of the Ministry's training program.

Water Technology Section

This Section conducted research with regard to

haloforms, ozone, iron, and maganese removal; distribution systems; and micro/macro-biological water quality.

Work on haloforms included an expanded Province-wide survey of haloforms found during water treatment plus a study of removal/reduction methods. A full-scale water plant project on reduced chloroform production was funded by Provincial Lottery money and was being carried out at the Belleville water treatment plant at year-end.

Because of the formation of chlorinated organics during chlorination water treatment, alternative disinfection procedures were investigated. A study of the use of ozone to treat colored water at the Smiths Falls water treatment plant included investigation of disinfection and by-products formation in addition to monitoring for haloforms when chlorine is applied after ozone treatment.

An asbestos monitoring program to cover all municipal water supplies was initiated. The start of the survey coincided with the implementation of standardized asbestos counting procedures and is to be correlated with treatment facilities at each specific plant. A paper was presented on this subject at the ACS annual meeting.

Technical advisory work continued with regard to the commissioning of new water plants, plant upgrading, and general plant operational and technical problems.

Safety Unit

The Safety Unit provides for the development and co-ordination of the Ministry's safety program.

A safety policy for the Ministry was produced, printed, and distributed. This document remains under ongoing review, particularly with regard to legislative changes.

A Safety Officers' Committee was formed with representation from the six regions, the Laboratory Services Branch, and the Safety Unit to enforce the safety program within the Ministry.

Liaison and co-operation with other agencies was continued. Section staff sat on a committee formed by the Ministry of Consumer and Commercial Relations and the Canadian Gas Association to develop Regulation C.G.A.-B 105, "Handling of Digester Gas". Technical support was given to the Halifax Public Service Commission in the form of a safety lecture in its Chlorine Operators' Course. Upon request, staff made safety inspections at non-Ministry waterworks and sewage treatment plants across the Province, and gave lectures on safety to municipalities and industries.

Participation in Ministry training courses included three presentations on first aid, five on entry to confined spaces, and 14 for the Training Certification Section.

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* *Waste Management*

As of August 1, 1978, the Solid Waste Unit and the Industrial Section of the Pollution Control Branch, as well as the Resource Recovery Branch of the Resources Division, were merged into the new Waste Management Branch. The new Branch is composed of two main sections: the Waste Utilization Section and the Waste Systems Planning Section.

The Waste Systems Planning Section will be primarily responsible for liquid and solid industrial waste. This responsibility will include the identification of industrial waste problems including the determination and evaluation of disposal options for this waste and the establishment of guidelines designed to prevent environmental damage from disposal.

The Waste Utilization Section will have similar responsibilities to the Waste Systems Planning Section but these will pertain to residential and commercial solid waste. The Province's resource recovery program will be the principal activity of this Section.

environmental approvals branch

Director: D.P. Caplice

The Environmental Approvals Branch offers a centralized approvals function for companies, individuals, and governmental agencies seeking project approvals under The Environmental Assessment Act and sections of The Ontario Water Resources Act and The Environmental Protection Act. Approval applications governed by The Ontario Water Resources Act and The Environmental Protection Act are screened by the Industrial Approvals Section and the Municipal and Private Approvals Section. The Environmental Assessment Section and the Land Use Co-ordination and Special Studies Section also comment on plans and policies suggested by other branches of the Ministry and other provincial and federal ministries and agencies.

The Environmental Assessment Section

This Section continued phased implementation of The Environmental Assessment Act to cover all major provincial, municipal, and private projects. The Act was proclaimed for provincial projects in 1976-77. Private industry remains exempt except on a case-by-case basis.

Section staff helped prepare Ministry policy and submissions on environmentally significant matters concerning the nuclear power industry, involving the Royal Commission on Electric Power Planning, and the Royal Commission on the Northern Environment.

Section staff were involved in consultation on preparation of terms of reference for the Royal Commission on the Northern Environment (Hartt Commission) and the co-ordination of the Ministry's submission to the Commission. They also provided a continuing liaison between the Ministry and the Commission.

In 1977-78, the Ministry received the first group of formal environmental assessments including Class Environmental Assessments from the Ministry of Transportation and Communications for the widening of roads and the realignments of road right-of-ways, grades, and cross-sections. The Ministry of Government Services submitted an environmental assessment document on a proposed community agricultural college residence complex for Centralia. These environmental assessments were under review at year-end.

INCO requested that a hydro-electric project, which it proposed to construct on the Spanish River, be designated under the Environmental Assessment Act and, at year-end, was preparing an environmental assessment under Section-prepared guidelines.

Onakawana Development Limited requested that the Company's lignite mining project planned for the James Bay/Moosonee area be placed under The Environmental Assessment Act. Data-gathering for the environmental assessment document was well under way at year-end.

Great Lakes Power Company Limited, the Ministry of Natural Resources, and individuals in Sault Ste. Marie requested that the proposed hydro-electric dam project on the St. Mary's River near the Sault Rapids be treated unofficially as an environmental assessment.

Major activities planned by Conservation Authorities in the Province were made subject to the requirements of The Environmental Assessment Act by regulation on September 1, 1977.

Section staff prepared and presented four major issue papers to the Porter Commission on electric power planning in the Province, and, at year-end, were writing the final document -- "Decision-Making in Electric Power Planning".

Section staff co-ordinated the provincial government's review of Environmental Impact documents submitted by Eldorado Nuclear Ltd. to the federal Environmental Assessment and Review Panel for the planned development of a uranium hexafluoride processing plant at Port Granby at Lake Ontario. Staff presented the provincial review and co-ordinated evidence presented before the federal Environmental Assessment Review Process (EARP) Hearings held in the fall of 1977 and winter of 1978 at Newcastle and Bowmanville. The EARP Hearing Panel found that the proposed plant site was unsatisfactory.

Section staff participated in the Environmental Assessment Board's hearings into expansion plans by Denison Mines and Rio Algom Mines for increased uranium mining output at Elliot Lake. Staff members prepared comments on the mining companies' proposals and presented evidence at the hearings. Staff also participated in discussions regarding radon gas contamination of proposed and existing housing in Elliot Lake.

Section staff reviewed water and sewer projects conditionally exempted under Section 30 of The Environmental Assessment Act. The exempted projects were too far advanced to be properly assessed or too small to be of major environmental significance. Staff reviewed 108 projects and 45 contracts tendered under the York-Durham servicing scheme.

Section staff provided environmental advice to the Ontario Energy Corporation regarding its five per cent share in the Syncrude Alberta tar sands operation.

The Land Use Co-ordination & Special Studies Section

This Section advises other governmental agencies and the private sector on environmental matters related to land use planning. It co-ordinates the Ministry's responses to regional development strategies, regional municipality official plans, and other proposed land uses to ensure that all environmental aspects are considered. It initiates or carries out studies on environmental matters affecting land use and on economic matters related to the environment in controlling pollution.

In 1977-78, the Section continued to participate, through inter-ministerial committees, in planning for Northwestern Ontario, the Parkway Belt, and the Niagara Escarpment. It also prepared and submitted materials for the Ministry's briefs to the Royal Commission on Electric Power Planning, co-ordinated the Ministry's response to the Report of the Planning Act Review Committee (Comay Report). The Section is represented on a federal-provincial committee considering solutions to the clean-up of radioactive waste. An econometric study of the pulp and paper industry was completed, and economic and financial analyses of several industries were carried out. In conjunction with the Resource Recovery Branch, the Section initiated a waste paper recycling program at the Ministry's head office. Several economic studies are under way on materials recovery and pollution abatement.

Industrial Approvals Section

This Section processes industrial applications for approval of treatment and control facilities, and provides technical expertise on industrial pollution control technology to branch and regional staff and to industry.

Section staff undertook a project to upgrade and rewrite guidelines and a manual on incineration of solid, liquid, and gaseous wastes. The work is to be completed in 1978-79. Staff provided assistance and comments regarding AECB licenses.

Approvals

Many plants which received approvals in 1976-77, started operations in 1977-78, including those owned by the following companies in the Sarnia area: Petrosar, Polysar, Union Carbide, Dow Chemical, Dupont, Ethyl Corporation, Sun Oil. The Petrosar Plant, a world-scale producer of ethylene cost $650 million; the Dow Chemical plant pioneered the biological treatment of effluent brine solutions.

In Thunder Bay, continuing abatement of the grain elevators reached the point whereby 80 per cent of the approvals for control had been issued by year-end. Abatement project costs totalled $15 million over 1976-77 and 1977-78, principally for particulate collecting equipment and labor.

The Section's greatest area of work concerned approval of Ontario Hydro projects, involving air, water, noise, and biological studies (fish entrainment and propagation). The capital cost of electrical generating plants, such as Bruce A, Bruce B, and the three heavy water plants near Kincardine, Ontario is approximately $5 billion. Potential electrical power from the complex is 6,000 megawatts (33 per cent of Ontario Hydro's electrical demand). Ontario Hydro's projects at the Pickering, Darlington, and Wesleyville generating stations were in initial submission stages for environmental engineering review at year-end.

Training and Seminars

Section staff helped to plan the Industrial Waste Conference, and to solicit, review, and screen technical papers for presentation.

Staff also helped to develop the Chemical Institute of Canada -- Environment Canada Training Course, the Industrial Abatement Course (MOE), and the Municipal Incineration Seminar (MOE, London).

Applications received and processed in 1977-78 are summarized below:

APPLICATIONS PROCESSED

APRIL 1, 1977 - MARCH 31, 1978

	Received	Approved	Cancelled	Denied
Air	720	628	82	3
Water	85	64	17	0
Waste	88	83	9	0
Total	893	775	108	3

Municipal and Private Approvals Section

This Section processes approval applications made by municipal and private agencies for water supply and distribution systems, wastewater collection and treatment facilities, and solid waste management programs. The Section also licenses septic tank installers and waste haulers.

The Section administers Sections 41 and 42 of The

Ontario Water Resources Act and Parts V and VII of The Environmental Protection Act. It provides technical review for financial subsidy applications made under grant programs of Central Mortgage & Housing Corporation and the Ministry of the Environment Regional subsidy program.

In 1977-78, the Section approved approximately 2,600 applications for programs costing more than $700 million, including a major expansion at the Highland Creek municipal sewage treatment plant in the Borough of Scarborough ($13 million), and an expansion to the Oakville water treatment plant in the Town of Oakville ($5 million).

A policy was developed in 1977-78 to transfer certain approval responsibilities under Sections 41 and 42 of The Ontario Water Resources Act to regional municipalities. The municipalities were requested to participate in a trial transfer program whereby they would conduct reviews of approval applications for the Ministry. The Section prepared draft guidelines for this purpose. A Standards Committee was established, made up of representatives from the Ministry and each participating municipality, to finalize the draft guidelines. During this trial period, assessment is to be made as to whether regional municipalities will assume total authority for issuing Certificates of Approval.

In 1977-78, 223 waste disposal sites were approved, the majority classified as organic soil conditioning sites designed to handle process organic wastes. Eight Environmental Assessment Board hearings were initiated, and one appeal request was received (settled by staff without recourse to Environmental Appeal Board). A favorable Environmental Assessment Board report (following a public hearing) resulted in a major landfill site being approved in the Regional Municipality of Peel.

The Environmental Assessment Board recommended non-approval of landfilling applications by Superior Sand Gravel and Supplies Limited and Crawford Allied Industries Limited for sites in the Maple area.

Section staff advised various regional municipalities to develop thoroughly documented applications for major landfilling sites. However, because of the need for separate hearings before the Ontario Municipal Board and the Environmental Assessment Board, and widespread public opposition to the establishment of such sites, the municipalities have been reluctant to proceed with their applications or make formal submissions to the Ministry.

Section staff took part in the Hughes Inquiry hearings into the affairs of Waste Management Incorporated. Three former Ministers of the Environment and various Ministry staff were called as witnesses. At year-end Justice Hughes was preparing a final report.

project co-ordination branch

Director: J.C.F. MacDonald

The Project Co-ordination Branch has prime responsibility for managing, co-ordinating, and reviewing all Ministry capital sewage and water projects from inception to the completion of construction. During 1977-78, the Branch handled 236 construction contracts and administered a capital expenditure of approximately $135 million. Of this amount, 42.5 per cent was paid out as subsidies under the Ministry's construction program for municipalities. (See Table I.)

The Branch undertook a number of water and sewage works projects for municipalities having no communal

facilities and extended existing facilities in many other municipalities. It also continued major sewage and water projects in South Peel Region, Niagara Region, and York-Durham Area, and undertook major extensions to water treatment facilities in Haldimand-Norfolk Region to permit the development of new housing.

In Northern Ontario, generous provincial government subsidy, combined with Central Mortgage and Housing Corporation grants for high-cost projects, enabled the Ministry to proceed with the provision of communal sewage and water facilities which will allow for growth and expansion of industry and housing. Additional funding, provided through the Ministry of Treasury, Economics and Intergovernmental Affairs under DREE (federal Department of Regional Economic Expansion) and RPB (Ontario Regional Priority Budget) schemes, enabled water and sewage works to proceed under this Branch's direction in Geraldton, Nakina, and Longlac. A similar program for the City of Timmins is proceeding under the City's administration.

In addition to the regularly subsidized sewage and water projects, this Ministry is also administering a number of other projects which are financed either solely by the Ministry of Northern Affairs or jointly by the Ministry of Northern Affairs and the Department of Regional Economic Expansion.

Projects financed by the Ministry of Northern Affairs included sewage and water works for Kenora, Ear Falls, Red Lake, Atikokan, and Schreiber. Jointly-funded projects included works for Longlac, Geraldton, and Nakina. All of these works were well advanced at year-end with completion scheduled for late 1979. Total estimated cost of these works is more than $30,000,000.

The Management-by-Results (MBR) system continued to be applied to all new projects considered.

MBR project evaluation for 1977-78 was as follows:

	No.	Estimated Cost
New projects accepted	33	$45,650,000
New projects rejected	27	31,100,000
Total Evaluated	60	$76,750,000

The Branch continued to administer the grants program for the construction of regional or area sewage and water treatment facilities in regional and specially restructured municipalities. These grants amounted to $20.350 million in 1977-78. Graphs I through IV for fiscal years 1971-72 to 1977-78 show:

(1) number and value of contracts tendered;
(2) construction activity by numbers of contracts;
(3) annual total expenditures for sewage projects and for water projects;
(4) annual total expenditures for provincial projects and for municipal projects.

(See Charts I-IV, pages 65 to 66.)

The Branch's Groundwater Development Section supervised five test-drilling contracts and three well-construction contracts with a total value of $340,000. The Branch also undertook 13 groundwater surveys and ten special investigations involving well testing and analysis of well and aquifer performance for Ministry projects.

The Branch sponsored innovative techniques for the construction of communal facilities in northern areas. Construction was well advanced on a low-pressure, shallow-buried sewer system for the old townsite of Temagami. In Keewatin, test sections of sewers and watermains were installed with different types of insulation and at various depths with monitoring facilities to check performance and resistance to frost action. This information

is being used in designing pipe installations for northern areas.

During 1977-78, the Branch continued to administer the concrete sewer-pipe-plant prequalification program. Thirteen concrete sewer-pipe-plants had prequalified status in 1977-78.

The MEA-MOE Construction Inspectors' Courses (Nos. 1 & 2) were again held. Approximately 50 candidates from municipalities and consulting engineering companies attended the one-week courses.

The Special Activities Unit performed approximately 70 field inspections of Ministry sewer and water projects, both at times of substantial completion and at expiry of contract guarantee periods.

During 1977-78, the Branch's Claims and Contracts Section handled 15 claims of a contractual nature. At year-end, five claims were either in the course of, or had been referred to, arbitration, and six were in the course of litigation. Approximately 65 claims amounting to $1,005,000 were received pursuant to the Public Works Creditors Payment Act and nine Hearings were conducted. Approximately 119 claims amounting to $2,425,000 were received pursuant to the Mechanics' Lien Act. The Section dealt with nine insurance-related claims.

resource recovery branch

Director: W. Williamson

The Resource Recovery Branch was established to co-ordinate the Province's Resource Recovery Program which includes the construction and development of the Experimental Plant for Resource Recovery in North York.

Energy Management

This joint program with the Ministry of Energy was continued in 1977-78 with special emphasis on the recovery of energy from both municipal waste and wood waste.

The initial study in the Town of Hearst on the feasibility of utilizing wood waste as an energy source was completed, and the results were sufficiently encouraging that a detailed technical and economic analysis was initiated. This study is to be completed in 1978-79 and includes recommendations on plant scale, technology options, and means of financing.

Although a previous study by the Branch on the possibility of utilizing municipal waste as a source of energy for the Ajax Steam Plant was discouraging, the Town of Ajax decided to proceed with a further study. At the request of the Town, Branch representatives provided advice and assistance. In co-operation with Metropolitan Toronto, a study was initiated to investigate the feasibility of modifying the Commissioner Street Incinerator to enable waste heat to be used to produce process steam for an adjacent industry.

At the request of the Town of Lindsay, a feasibility study was carried out concerning the use of a controlled air incinerator to produce steam for use by either local industry or a hospital complex.

Source Separation

Four source separation projects were developed to obtain information on means of recovering waste newspaper, glass, and cans from individual residences, and to determine how such projects could be incorporated in the Ministry's comprehensive program. Three of these projects, in the City of Toronto, Etobicoke, and Georgetown (Halton Hills), incorporated curbside collection by municipal vehicles. The fourth project in Aurora incorporated the use of depot systems. The Branch is responsible for general development of the program, public information, and monitoring of the results. Income from recovered materials will be used to defray municipal costs.

The success of the pilot projects for fine office paper separation led to the initiation of a similar program throughout the Ministry's head office building at 135 St. Clair Avenue West. If this type of full-scale operation proves successful, it could then be extended to other public and private office buildings. At the request of Management Board of Cabinet, the Branch initiated a study on the feasibility of paper recovery throughout government buildings in Metropolitan Toronto.

Technological Development: Experimental Plant and Demonstration Projects

Construction of the $15 million Experimental Resource Recovery Plant was completed, and plant operation was commenced by the private waste management company (Browning-Ferris Industries of Toronto Ltd.) contracted for this purpose. The design concepts utilized for the waste receiving and direct transfer sections of the plant proved to be completely successful, and initial results from the processing operations appear equally promising. Facilities were also installed to test the use of refuse-derived fuel as a partial replacement for coal in a cement kiln in Woodstock (Canada Cement LaFarge Ltd.). A demonstration project is to start in 1978-79.

A 12-month demonstration of the use of advanced waste collection systems in the City of Windsor was completed. A detailed technical and economic evaluation of the systems was made, and a report is to be published for consideration by other municipalities in the Province.

A committee, representing the Branch, the Regional Municipality of Peel, and Reed Limited, was set up to develop two agreements: 1) for assessment of the technical and economic viability of the Reed Limited proposal for a material and energy recovery plant in Peel, and 2) for plant design, construction, operation, and marketing, if the proposal is found to be viable.

Detailed engineering design and equipment selection for the "Watts from Waste" project continued. Plant construction is to commence in 1978-79 at the Toronto Lakeshore Hydro Electic Generation Plant.

Central Processing Plants

A waste management planning study was carried out in Cornwall, while another such study was initiated in the Timmins Area.

A joint provincial-federal study was initiated in North Bay to investigate the feasibility of utilizing waste from North Bay and the Armed Forces base to provide steam for base requirements. The study could lead to a solution to bird problems associated with the existing North Bay landfill disposal site.

A committee was set up in the Niagara region, representing the Branch, the Regional Municipality, and the Ontario Paper Company, to examine the feasibility of establishing an energy resource recovery plant in Thorold that would produce steam from garbage waste for use by the Company.

The Branch continued to work with the Regional Municipality of Halton on a proposed resource recovery plant, and carried out a study to select possible sites. The Branch also carried out a detailed financial analysis and a marketing study for such a facility.

Market Development

Marketing contracts were entered into for corrugated cardboard and ferrous metal recovered at the experimental plant. By arrangement with Metropolitan Toronto, separately collected waste newspaper in the Metro area was delivered to the plant and baled to improve its marketability.

Investigations continued concerning possible additional markets for paper, ferrous metals, glass, and compost.

Effective August 1, 1978, the Resource Recovery Branch was incorporated into the Ministry's new Waste Management Branch.

regional operations and laboratories division

Assistant Deputy Minister: W.B. Bidell

northwestern region

Acting Regional Director: R.M. Gotts

Municipal & Private Abatement

Regional staff inspected all communal water and sewage treatment facilities within the Region. In addition, they conducted various special surveys and studies, including several bacteriological and chemical studies of water quality in municipal water distribution systems, two loading studies at water pollution control facilities, a performance evaluation of a Bio-Disc sewage treatment unit, an infiltration study of a municipal sewage collector system, and water pollution surveys of several municipalities. Considerable construction activity occurred within the Region with regard to municipal water and sewage projects.

Staff inspected all municipal landfill and derelict motor vehicle sites, and refuse disposal sites kept by the Ministry of Natural Resources. Municipal participation in "Project Remove" resulted in the collection of 2,500 derelict motor vehicles. Establishment of the Waste Management Improvement Program enabled many municipalities to upgrade facilities to meet present day standards. Compliance with the new carbonated soft drink container legislation, initially slow in remote areas, improved considerably toward year-end, mainly as a result of increased staff activity and greater public awareness.

Cottage pollution control programs were completed on the Shebandowan Lakes system, continued along the north shore of Lake Superior east of Thunder Bay and in the Kenora and Fort Frances areas, and completed on Pelican

and Abram Lakes in the Sioux Lookout area. Staff reviewed over 1,350 cottages during the 1977 summer period.

The Region conducted the boating and marina inspection program with particular emphasis on ensuring the adequacy of shore-based pump-out facilities. The boat inspection program included 164 regional inspections; one summary conviction ticket was issued in the Thunder Bay area.

Enforcement of The Pesticides Act, 1973 and Regulations emphasized the licensing of land exterminators for herbicide applications and structural exterminations for insecticides in terminal grain elevators.

Industrial Abatement

The main industrial abatement effort in 1977-78 was again directed at correcting environmental problems associated with the pulp and paper industry. Three Control Orders under The Environmental Protection Act and three Requirement and Directions under The Ontario Water Resources Act were issued during the year covering pollution abatement programs at pulp and paper mills in the Region. Notices of Intent to issue Control Orders at two other mills were pending with issuance anticipated very shortly after the year-end. With completion of this effort to formalize abatement programs in this industry, all mills in the Region will be covered by such formal programs with one exception. The excepted mill completed its formal program at year-end and a new one was being considered.

The new Great Lakes Paper Company Limited, Thunder Bay kraft mill, utilizing the closed-cycle effluent system, continued to improve its performance. The Company made a formal commitment to the Ministry under the Requirement and Directions to convert its older kraft mill at the same site to this system.

The mercury cell chlor-alkali plant operated by American Can of Canada Limited at Marathon was closed down and dismantled under the terms of a Ministry Control Order. Ministry staff supervised the dismantling operation and the subsequent encapsuling of contaminated materials in concrete in a Ministry-approved landfill site.

Two prosecutions by the Ministry were successfully completed. Amercian Can of Canada Limited was found guilty of 16 charges laid by Ministry staff under the federal Fisheries Act concerning excessive mercury discharges from its Marathon chlor-alkali plant and was fined $64,000. Reed Ltd. was found guilty of five charges laid under The Environmental Protection Act relating to pollution of the Wabigoon River by its Dryden pulp and paper mill and was fined $5,000.

Dust abatement programs progressed at the terminal grain elevators in Thunder Bay. Within the City, dustfall measurements have shown an overall reduction of 30 per cent since these programs were started. At dustfall stations near elevators, where programs are completed, reductions are as high as 70 per cent.

It is anticipated that the end reduction in grain dust emissions will be 95 per cent upon completion of all programs in 1978-79.

Air Quality

The Air Quality Assessment Unit continued major monitoring surveys in seven urban centres and issued annual reports for these areas for the year 1976. Special investigations utilizing vegetation, soil, and snow sampling techniques and direct-air monitoring were also conducted near several forest, mining, and grain elevator operations. The regional network of 130 instruments, several of which were added during the year, measured particulate pollutants, sulphation rate, sulphur dioxide, hydrogen sulphide, wind direction, and wind speed.

Water Quality

The Water Resources Assessment Unit operated a 47-station water quality monitoring network for lakes and streams in the region and conducted regular samplings for the International Joint Commission on 11 streams entering Lake Superior. Monitoring was also carried out on the Rainy River for the Rainy River Board of the International Joint Commission. Evaluation of recreational lakes included a portion of the Lake-of-the-Woods, and seven lakes were included in the "Self-Help" program . Major surveys included the assessment of surface waters affected by mining operations at Red Lake and on Sturgeon Lake. A special survey of Thunder Bay innner harbour in the vicinity of the Abitibi Provincial Paper Mill was also undertaken. Fish for mercury analysis were collected from the Rainy River and Penninsula Harbour.

Environmental Planning

The Approvals and Planning Unit continued its responsibility for co-ordination of regional responses to environmental impact statements and review of municipal subdivision proposals. In co-operation with the Water and Air Assessment Units, magnetic tape data files were created to improve regional capability to retrieve, analyze, and interpret information collected at water and air quality monitoring stations.

Laboratory Operations

In May of 1977, the new Thunder Bay Regional Laboratory was officially opened. The design of the building allows for expansion of analytical capabilities in the chemical and microbiological sections. Significant time was devoted to developing expertise in the analysis of soil and vegetation. In line with the trend of past years, the number of samples received increased over that of 1976-77.

Utility Operations

The Utility Operations Section operated 11 water treatment plants and 12 sewage treatment plants. Five new projects were commissioned during the year, and the transfer of operating responsibility of the Thunder Bay W.P.C.P. to the City of Thunder Bay was completed. Construction starts were made on five water treatment plants and three sewage treatment plants.

northeastern region

Director: C.E. McIntyre

Industrial Abatement

Seven Control Orders and two Requirements and Directions were issued to four pulp and paper mills, one abandoned base-metal mine, one non-ferrous smelter, one lumber mill, and two uranium mining and milling operations.

The new smelter at Falconbridge Nickel Mines was completed and will reduce SO_2 emissions to a maximum of 465 tons per day.

A detailed quality study of effluent (BOD, COD, and toxicity) from the Spruce Falls Power and Paper Company's new thermal mechanical pulping unit was carried out. The company also completed an assimilation study on the Kapuskasing River in response to a Control Order.

Cleanup operations of the heavily PCB-contaminated soil at Dowling was completed. Further investigations regarding deeper PCB penetration of the soil is to continue in 1977-78.

Municipal and Private Abatement

The Region completed 50 lake and municipal surveys and visited 1,145 cottages and residences to check water supply and sewage disposal systems.

Under "Project Remove", 22 municipalities participated in the collection of 4,697 derelict motor vehicles. In addition, 13 municipalities took part in a program to improve their solid waste management operations. Included were two beach cleanup projects.

Seven pending legal actions in the municipal and private abatement area were resolved in 1977-78, and six new actions were initiated. Considerable manpower was spent on collecting and assessing radiological data, preparing interim status reports, and participating at various meetings and review committees concerning the Environmental Assessment Hearings on the proposed mining expansions at Elliot Lake.

Air Quality

A total of 220 instruments and recorders monitored air quality throughout the Region. In addition, studies for suspended particulate were conducted in Cobalt (arsenic), Matheson and Matachewan (asbestos), Elliot Lake and Agnew Lake (radiological), Sault Ste. Marie, and Little Current.

The Plant Pathology Unit collected over 1,700 vegetation and soil samples throughout the Region and investigated 23 complaints of possible air pollution injury to vegetation. A special white pine study and remote sensing program involving satellite and low-level photography was initiated to study the effects of air pollutants on vegetation in the Wawa area. A leaf litter decomposition study was also initiated in the Timmins area to study the effects of zinc in the litter layers.

Water Quality

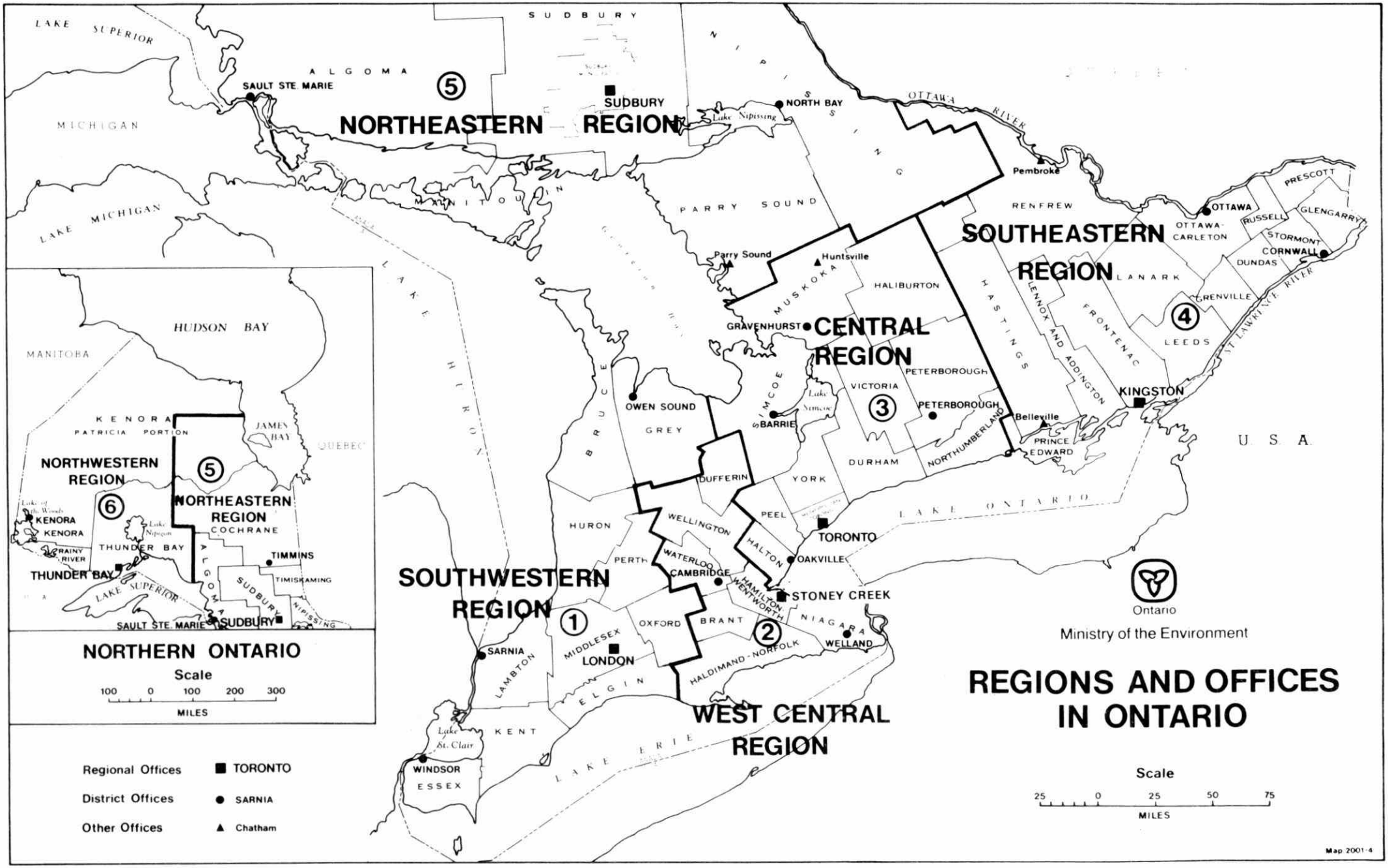
The Region completed a significant number of water quality projects including: springtime phosphorus classification studies on 36 lakes, six ground-water interference investigations, 16 ground-water contamination investigations, 29 ground-water assessment studies, and 28 water quality assessment studies. In addition, the Region maintained 154 routine water quality monitoring stations.

Utility Operations

The region operated 22 water treatment, and 45 sewage treatment facilities, six of which went into operation during the year.

The Region completed the design of a sludge dewatering system for the North Bay W.P.C.P. and called tenders for the supply and erection of a centrifuge building. It is anticipated that the City will save approximately $1.7 million by having the facility designed and constructed through the Ministry rather than through a consulting engineering firm.

The design and construction of a sludge thickening tank for the Sudbury W.P.C.P. was nearing completion at year-end. The tank will obviate the need for aerobic digestion at the plant and result in an energy saving estimated at approximately $100,000 per year.


LAKE SUPERIOR
MICHIGAN
LAKE MICHIGAN
LAKE HURON
SUDBURY
NIPISSING
OTTAWA RIVER
ALGOMA
SAULT STE. MARIE
SUDBURY
NORTH BAY
Lake Nipissing
MANITOULIN
PARRY SOUND
Parry Sound
Huntsville
MUSKOKA
HALIBURTON
Pembroke
RENFREW
OTTAWA
OTTAWA-CARLETON
PRESCOTT
RUSSELL
GLENGARRY
STORMONT
CORNWALL
DUNDAS
LANARK
GRENVILLE
LEEDS
ST. LAWRENCE RIVER
HASTINGS
LENNOX AND ADDINGTON
FRONTENAC
KINGSTON
Belleville
PRINCE EDWARD
PETERBOROUGH
NORTHUMBERLAND
DURHAM
VICTORIA
YORK
DUFFERIN
SIMCOE
Lake Simcoe
BARRIE
GRAVENHURST
OWEN SOUND
GREY
BRUCE
PEEL
TORONTO
HALTON
OAKVILLE
WELLINGTON
WATERLOO
CAMBRIDGE
HURON
PERTH
HAMILTON-WENTWORTH
STONEY CREEK
NIAGARA
WELLAND
OXFORD
BRANT
MIDDLESEX
LONDON
SARNIA
LAMBTON
ELGIN
KENT
ESSEX
WINDSOR
Lake St. Clair
HALDIMAND-NORFOLK
LAKE ONTARIO
LAKE ERIE
U.S.A.
NORTHEASTERN REGION
5
SOUTHEASTERN REGION
4
CENTRAL REGION
3
SOUTHWESTERN REGION
1
WEST CENTRAL REGION
2
HUDSON BAY
MANITOBA
QUEBEC
JAMES BAY
KENORA PATRICIA PORTION
NORTHWESTERN REGION
6
NORTHEASTERN REGION
COCHRANE
KENORA
RAINY RIVER
THUNDER BAY
TIMMINS
TIMISKAMING
NORTHERN ONTARIO
Scale
100 0 100 200 300
MILES
Regional Offices ■ TORONTO
District Offices ● SARNIA
Other Offices ▲ Chatham
Ontario
Ministry of the Environment
REGIONS AND OFFICES IN ONTARIO
Scale
25 0 25 50 75
MILES
Map 2001-4

southwestern region

Director: D.A. McTavish

Industrial Abatement

At Sarnia's request, the Ministry extended the Air Pollution Index (API) system to that City. Although the preparitory level of 32 was exceeded once in 1977-78, it is considered unlikely that pollution levels will occurr that will require area industries to curtail operations.

A program was introduced in 1976-77 to minimize pollution problems arising from the use of vegetable cannery wastes as a livestock food supplement. Follow-up of this program in 1977-78 showed that users of such materials were taking precautions to avoid water pollution, and no major problems were experienced in this regard during the year.

There was a 38 per cent increase over 1976-77 in the number of applications filed by farmers for Certificates of Compliance. The increase was primarily due to municipal controls applied in many townships and greater environmental awareness and concern on the part of livestock farmers.

Southwestern Region and the Air Resources Branch continued work on revision of the regulation governing sulphur dioxide emissions in the Sarnia area. It is expected that the new regulation will be issued in 1978-79, and that implementation of appropriate compliance programs will follow in order to achieve the Ontario objective for sulphur dioxide in the area.

As a result of increasing concern over metals in sewage treatment plant sludge disposed of on farmland, the Region initiated a study in the City of Stratford to determine the practicability and the economic implications of reducing the metal content of such sludge. The study includes plating plant surveys, the sampling of effluent discharges from these plants, and the sampling of various operations at the Stratford sewage treatment plant. Alternatives for reducing metal discharges from industries and ways to implement a wide-scale abatement program were being evaluated.

Staff of Southwestern Region and the Air Resources Branch maintained frequent communiciation with their counterparts in Michigan and Wayne County in accordance with provisions of the Transboundary Memorandum of Understanding. Prominent issues in 1977-78 were a proposed expansion of Detroit's sewage sludge incineration facilities; an unusually high incidence of electrical equipment fires in West Windsor, attributed to particulate fallout from Wayne County sources; a proposal by the Peerless Cement Company in Detroit to use one of their cement kilns for the destruction of PCBs.

Municipal and Private Abatement

The Region closed a privately-owned and operated landfill site in West Oxford Township after eight wells were polluted by the leachate emanating from the site. Negotiations to establish alternate water supply systems for affected individuals in the area were under way at year-end.

The City of London opened its Westminister Township landfill site. The City is phasing its Clark Road site out of operation and plans to convert it to a transfer station. The County of Elgin entered into an agreement with a private hauler for garbage collection and disposal.

The Environmental Assessment Board approved re-zoning of land in the area for disposal purposes provided certain conditions were met. At year-end regional staff and the owner of the site in question were negotiating the establishment of these conditions.

The City of Woodstock expanded the capacity of its sewage treatment plant from 4.5 million gallons per day to 8 million gallons per day in order to be able to meet the requirements of the Thames River Basin Study. The City of London doubled the capacity of its Adelaide Sewage Treatment Plant from 2 million gallons per day to 4 million gallons per day and incorporated nitrification at the same time. Both expansions are to be finished in 1978-79.

The City of Chatham initiated design for expansion of its sewage treatment plant and began a search for a suitable landfill site to serve Chatham and other municipalities in the County of Kent. Opposition to the establishment of a landfill site in rural Kent County was encountered. At year-end Ministry staff were meeting regularly with the Solid Waste Management Committee of the County of Kent to review available disposal alternatives.

The Ministry developed an interim servicing plant for the Township of Collingwood. The interim works would be extensive and designed to operate for an extended period. If necessary, the works would become permanent if anticipated area growth did not take place. The Ministries of Industry and Tourism, Environment, Housing, and TEIGA are jointly working on this project.

The Ministry undertook a landfill site upgrading program in Southwestern Ontario, entering into 19 contracts with municipalities and spending approximately $70,000. The program resolved several long-standing disposal problems. Many of the municipalities also expended additional funds to upgrade their sites further.

Air Quality

During 1977-78, the Air Quality Assessment Unit maintained 90 monitoring sites, collecting pollutants over 30-day periods; 32 instruments, collecting suspended particulates every sixth day for 24-hour periods; and 68 continuous air monitoring instruments. The goal of achieving 90 per cent valid data was surpassed, and 553,000 measurements were collected.

The air quality monitoring network was expanded with the introduction of three continuous ozone monitors in rural areas, particulate monitoring in St. Mary's and Goderich, and intensified monitoring for particulates and sulphur dioxide in Windsor and Sarnia.

Special surveys were conducted to assess the impact of grain elevators on dustfall at Blenheim and to ascertain the source of fluorides in Ingersoll.

Environmental Planning

The Approvals and Planning Unit reviewed 125 applications for the approval of pollution abatement equipment and facilities associated with air, water, and land resources. Regional comments and recommendations were provided on 20 provincial projects, and comments on approximately 90 official plans, amendments, and zoning orders were provided to the Ministry of Housing. Fifty-five appraisals were made of other land use documents and development proposals.

Water Quality

The Water Resources Assessment Unit participated in establishing waste control requirements for 26 municipalities based on assessments of surface water assimilation capacities. Surveys were conducted on 15 watercourses and included a major 60-station biological-chemical

assessment of the St. Clair River as part of the St. Clair River Organics Study. Programs were also expanded to include winter stream assessments.

The Unit promoted the development of an artificial marsh treatment experiment at Listowel and an infiltration land treatment system at Markdale. Increased emphasis was attached to identifying, and educating the public to the significance of, agricultural and urban runoff contributions to impaired water quality.

The Unit investigated 50 complaints concerning water supply contamination, and completed 49 water quality interference investigations and ten landfill assessments. The monitoring of 30 private water wells in Lambton County was continued to ensure that past deep well disposal activities had not created contamination problems, and fluid levels were monitored monthly in five brine injection wells. Long- and short-term water level fluctuations in the Region were assessed by means of a 76-point observation well network.

Through the Water Well Inspection Program, 1,800 water wells were investigated, of which 40 per cent were considered to be deficient in one or more aspects. A total of 2,213 well records were reviewed and corrected prior to locating and plotting them on permanent map records. Thirty complaints of improper well construction and pump installation were investigated. Increased exphasis was placed on proper well abandonment and plugging.

Altogether, Water Resources staff provided short-term reviews or assessments on 341 separate matters such as marine construction proposals, official plans and amendments, subdivision proposals, Permits To Take Water, pump tests, sewage design reports, and various resource development proposals.

Laboratory Operations

The London Regional Laboratory performed 156,110 chemistry tests on 18,054 samples and 43,905 microbiological tests on 14,892 samples.

An automated "Hardness" method was developed and several experiments were completed involving survival of the aerobic bacterium Pseudomonas aeruginosa during anerobic digestion. This involved considerable developmental work as did work on media selection for isolation and identification of Clostridium perfringens.

Assessments were completed on biodegradation of selected organic compounds recovered from river sediments as a contribution to the St. Clair River Organics Study.

Utility Operations

In 1977-78, the Regional Utility Operations Section managed and operated 66 sewage treatment and collection facilities and 45 water treatment, trunk main, and distribution facilities serving approximately 740,000 people. The Section consisted of four management staff, three maintenance co-ordinators, one safety officer, and 147 permanent and 33 part-time plant operating personnel.

The safety training program increased in momentum. Regional and district office staff, and water and sewage treatment plant personnel received training in "Entry into Confined Spaces", defensive driving, fire-fighting, and first aid. A Regional Safety Committee comprising staff from all disciplines was formed.

west central region

Director: C.J. Macfarlane

The West-Central Region is a diverse matrix including densely-populated industrial and commercial centres as well as less populated rural and farming areas. Population is approximately 1.4 million, comprising 400,000 households.

Air Quality

Air Quality in Hamilton improved only marginally in 1977-78 after more marked improvement in previous years. Suspended particulate levels were slightly lower in line with significant decreases over the previous seven years. While ozone levels improved with fewer hours of excessive levels, NO_2 levels continued to increase as they did for three years before. Other parameters were generally unchanged at Hamilton. Airborne dust from roads and city streets continued to provide a significant input to total particulate load. Further improvement in air quality will be achieved when particulate from this source is reduced.

At Nanticoke, dustfall levels increased to critical levels. Fluoridation and sulphation rates increased significantly, but were still below criteria levels.

Elsewhere, there was general improvement with regard to total suspended particulate levels and the number of hours of excessive ozone levels. Other parameters were generally unchanged at acceptable levels with the exception of two local sites in Niagara Falls and Galt. No Air Pollution Index (API) episodes were recorded in Welland or Niagara Falls.

Public complaints regarding air quality dealt primarily with malodours. Progress was made in reducing the degree of odour emissions, but many "controlled" sources continue to be unacceptable to residents. In many instances, complaints arose as a result of changed land uses (e.g., residential developments built adjacent to industrial lands).

Water Quality

The Grand River and its watershed serves many people and municipalities and is almost entirely contained within the West-Central Region. It is used for the assimilation of municipal sewage and industrial wastes, for water supply, and for recreation. Proper management of the entire system is of major importance since a watershed is continuous and interconnected and what affects one part usually affects another.

West-Central Region was involved in numerous studies and activities related to the Grand River, including:

(1) a major report, "Water and Sewage Options for the Central Grand River";
(2) assimilation studies for the Nith and Upper Grand Rivers including New Hamburg, Elmira, Fergus, and Elora;
(3) Negotiations with Guelph for the operational integration of the water supply and sewage treatment facilities with respect to river water quality including the first requirement for nitrification of a municipal effluent;
(4) provision of extensive information for the formal environmental assessment being undertaken by the Grand River Conservation Authority;
(5) participation in detailed planning of the ongoing GRIC study of the basin.

In other areas, the aeration system was continued in Hamilton Harbour with some further improvement in water quality. A Certificate of Approval for the sewage treatment plant expansion at Dundas was issued. It included, for the first time, specific emission requirements tailored to the preservation of Cootes Paradise marsh, or Dundas marsh, as a natural conservancy area.

Industrial Abatement

Six paper mills operate in the Niagara Region. Control Orders were served on three mills and Program Approvals were accepted for two mills. All actions were directed at reducing liquid waste discharges from their operations. The sixth mill was already in compliance with required emission standards. Final compliance dates ranged from December 1979 to December 1982.

Dofasco and Stelco again made major capital expenditures on pollution control equipment for cleansing of air from blast furnaces, sinter plants, coke ovens, melt shops, and a water filtration plant. Both companies undertook extensive measures to control windblown dust from coal piles. As a result, no further complaints were received concerning this problem.

Fluoride emissions from IMC in Port Maitland caused high fluoride levels in forage in the early summer weeks of 1977. The company shut down its super phosphate manufacturing process and made process modifications. Subsequent sampling of forage indicated a reduction to acceptable levels. To reduce phosphorus discharges to the Grand River, the company is planning to phase out one of its gypsum storage ponds.

Cyanamid of Canada improved control of brownish-colored oxides of nitrogen emissions at its Niagara Falls plant.

Rothsay Concentrates continued to be the most significant generator of odour complaints. In 1977-78, the company installed new abatement equipment and undertook major plant changes which should result in reduced odour emissions.

Municipal & Private Abatement

Scheduled inspections and monitoring of municipal (and communal) water, sewage treatment, and solid/liquid waste disposal facilities received greater emphasis during 1977-78 than in previous years and accounted for 30 per cent of total municipal and private abatement field activity.

Construction was under way for a new water treatment plant at Fort Erie. New plants or expansions were being planned for the St. Catharines (De Cew) and Port Colborne water treatment plants.

West-Central Region's many small communal water works (serving summer cottage areas and a number of small municipalities) were frequently inspected once again in 1977-78. Their operators now maintain adequate records and are capable of carrying out routine sampling for themselves.

In a number of smaller municipalities, old septic tank systems are either failing or inadequate. The Ministry's new grant policy for private systems should lead to some improvement in this regard.

West Central Region encouraged a number of municipalities to initiate water and sewer restoration programs. In Port Colbourne, leak repairs resulted in a 40 per cent reduction in water consumption at a saving to the City of $100,000 per year.

The sanitary landfill sites of several municipalities are becoming full, and new sites cannot be readily obtaind. Several existing landfill sites in Hamilton-Wentworth are overtaxed, and proper closure will be most difficult. A new landfill site for the Region is being proposed, but first must undergo environmental assessment.

central region

Director: P.G. Cockburn

Central Region is one of the heaviest industrialized and intensively used recreational areas in the Province.

Significant activities included an air quality improvement program in the core area along the Lake Ontario basin (studied in regard to receiving capacity), environmental control activities in recreational areas, liquid waste disposal, and the investigation of private well problems.

Air Quality

Major improvements in Toronto's air quality achieved over the last ten years were maintained during 1977-78. The sulphur dioxide level was essentially unchanged from 1975 at a value well below the annual criterion (see Table III). Suspended particulate remained slightly above the annual criterion (see Table IV). The API (Air Pollution Index) exceeded the maximum desirable level on only three occasions. Table II summarizes the number of occasions the API has exceeded the desirable level for Toronto since its inception in March 1970.

Monitoring for hazardous substances was continued in 1977-78. The intensive lead monitoring program in the vicinity of five Toronto-area lead plants was maintained. Airborne asbestos was monitored at five asbestos-using plants in the Region. Emergency monitoring for hazardous substances at the site of major fires was initiated.

During the year, 349 applications were processed and approved related to environmental emissions. Evaluations involved analysis of combustion equipment, plant, and process exhausts with or without control equipment. Particular attention was given to asbestos and heavy metal emissions and those of other potentially-hazardous substances such as TDI, MDI, PVC, and PCB.

Water Quality

Protection of water quality in recreational areas occupied a large part of regional staff time. Activities included lakeshore surveys of sewage works serving cottages, self-help programs to determine the quality status of recreational lakes, lake water quality surveys, the survey of Muskoka Lakes for mercury in fish, the survey of lakes in Haliburton, and the review of the nutrient inputs to the Scugog Lake and River.

Recreational lake surveys were undertaken in Belmont, Round, Cordova, and East and West Twin Lakes in Peterborough County; the Milford Bay area of Muskoka Lake; Paudash Lake; and Georgian Bay at Honey Harbour. A total of 2,634 cottages were inspected to ensure that sewage treatment facilities were adequate.

Concerned cottagers and permanent residents on 81 recreational lakes participated in the Self-Help Program. The data collected enables the trophic status of these lakes to be determined and subsequently monitored on a yearly basis.

In response to the discovery of elevated fish mercury concentrations, an extensive study was conducted within the Lake Muskoka Drainage basin. Sediments and water from more than 20 lakes were analyzed for mercury content. Additionally, all municipal and direct industrial waste discharges were investigated as were any possible historical sources of mercury. The survey failed to account for the elevated fish mercury concentrations and is to be continued in 1978-79.

A water quality report on the Scugog River was released indicating the River to be enriched with nutrients and organic materials. The discharge of the Lindsay sewage lagoons into the river contributes, to a minor degree, to this enrichment problem, and improvements in their treatment efficiency were made.

A co-ordinated program, involving the Algonquin Region and the Ministry of Natural Resources, enabled water quality surveys to be conducted on 27 previously unsurveyed lakes within the Dysart (et al.) Planning Area of the Provincial County of Haliburton. This data will be used primarily to assess future development proposals in the area.

The Region investigated several major ground-water level interference problems and alleged well contamination problems affecting private wells. Extensive surveys of affected wells in Glen Williams and Unionville established that 80 per cent of shallow-dug wells were poorly constructed and/or maintained, and that their water contamination problems were directly related to surface waters entering into them.

Industrial Abatement

The Region expanded the radiological monitoring of surface waters downgradient of abandoned uranium mine tailing areas in the Township of Cardiff to determine the impact of these tailing areas on the water quality of nearby streams and lakes. The water quality of Paudash and Eels Lakes situated downgradient of these tailing areas are within the permissible drinking water criteria for gross beta emitters and Radium 226.

The Region was involved with clean-up operations, public liaison, and air monitoring in connection with two major fires and an explosion. The first fire was in an underground, PCB-filled transformer in the City of Toronto. The incident occupied approximately 55 per cent of available district staff time for a one-month period.

The second fire took place in a warehouse containing APS and PVC materials in the Village of Colbourne. The explosion occurred at a plant in the Town of Vaughan where two drums of insecticide exploded, causing a plume of mercaptan-like odour to travel across the eastern part of Metropolitan Toronto.

Progress was made with long-term control programs at automotive assembly plants. Tests conducted at the General Motors plant in Scarborough indicated a significant reduction in odour emissions as a result of a process change. Further studies are to be carried out at American Motors in Brampton and Ford in Oakville to define more clearly the specific source and nature of odour emissions at these operations.

Eighty-seven garbage incinerators were phased out of use in 1977-78. The first successful prosecution related to emissions from a garbage incinerator occurred in June 1977 against an apartment building in Etobicoke.

In Peterborough District, a federal government environmental assessment panel recommended that Eldorado Nuclear Limited not build a new uranium refinery at Port Granby. Camindex Mines applied for reinstatement of uranium claims in the Looncall and Wolfe Lake recreational areas. Leases were granted to the company by the Ministry of Natural Resources on the condition that any proposed

mining venture be made subject to an environment assessment under The Environmental Assessment Act.

The Beare Road landfill site in the Borough of Scarborough continued to be the only outlet for the disposal of inorganic liquid wastes in 1977-78. The deadline for closure of the site to liquid wastes was extended from December 21, 1977 to April 30, 1978, at the request of this Ministry. At year-end, a task force was established by Metropolitan Toronto and the Ministry to find alternative means for the disposal of liquid wastes.

The Region of Durham presented a proposal for having the Ajax sewage treatment plant converted into a liquid waste treatment facility when it is phased out as part of the York-Durham sewage servicing scheme.

A hearing is to be held in 1978-79 to review the possibility of a cement plant in the City of Mississauga using toxic liquid industrial waste as a fuel.

Environmental Planning

Central Region continued to participate in provincial-level planning and in inter-agency planning with regional municipalities. Staff provided environmental planning input to the review of an increasing number of development proposals submitted to the Province under the requirements of The Planning Act. Liaison with municipal planning staff, planning consultants, and private developers increased in an attempt to introduce environmental concerns at an early stage of design.

Activities resulting from the requirements of The Environmental Assessment Act increased, as several major undertakings of the provincial government are located in Central Region.

southeastern region

Director: R.E. Moore

Routine workload in 1977-78 involved over 6,300 inspections of water, land, and air pollution control facilities operated by municipalities and industries. This represented an increase of 50 per cent over the previous year.

Water Quality

The Region operated four streamflow gauges and 18 well recorders, maintained 170 water quality monitoring stations, and, in conjunction with the Ministry of Natural Resources, surveyed 34 recreational lakes. The Cottager's Self-Help Program was increased to include 93 lakes in the Region.

Major reports released during the year included:

(1) Concentration of Mercury in Sediments and Fish of the St. Lawrence River;
(2) A Report on Water Quality Management of the Lake Trout Waters of Southeastern Ontario;
(3) Cottager's Self-Help Program: Enrichment Status of Seventy-Nine Lakes in the Southeastern Region of Ontario.

Environmental Planning

The Region handled 1,244 requests regarding Official Plans and Amendments, Zoning Bylaws, Environmental Assessments, Certificates of Compliance, ODC/DREE applications, and Sewage Works Approvals -- an increase of approximately 20 per cent over 1976-77. There was also increased

liaison with local municipalities, planning boards, other agencies and ministries of government, and consultants respecting this Ministry's input to urban, rural, and recreational land use planning.

Industrial Abatement

The Region investigated 112 spill incidents including a Texaco Domestic Pipeline Division leak of 31 kl of furnace oil and 114 kl of gasoline at a terminal in Ottawa. This incident was caused by ice heaving free lines connected to a pump. Four Enforcement Orders were issued, including one to a company discharging arsenic-bearing effluent to the Moira River. Approximately 1,100 complaints were handled, almost all successfully.

Laboratory Operations

The Regional Laboratory in Kingston continued to be a key function in terms of assistance to field operations. Workloads were increased by 30 per cent in the chemistry laboratory and 40 per cent in the microbiology area. These increases stemmed equally from municipal and private abatement field surveys and water resources assessment programs.

Utility Operations

Regional staff operated 72 water and sewage treatment facilities, of which seven were added during the year. A Management-by-Objectives program, introduced into utility operations, showed 80 per cent of the sewage works and 92 per cent of the water works in the Southeastern Region to be meeting objectives. In conjunction with this program, the Region participated in a one-year plant performance data computerization experiment, the results of which led to the development of a new data collection system for Ministry projects throughout the Province.

Municipal and Private Abatement

The Waste Management Program was quite successful; the main effort was directed toward the upgrading of problem sites. The funding program was very well received by the municipalities and significant improvements were accomplished. Solid waste disposal sites and systems continued to occupy considerable time and required 903 inspections.

Unanticipated assumption of Part VII work from the Ottawa Health Unit necessitated drastic workload revisions for Ottawa district staff. Approximately 45 per cent of staff time was spent on this program involving approximately 1,300 inspections of Part VII systems.

Boat Marina and Ice Hut programs were maintained through 1,778 inspection visits. The lakes regularly toured by the Ice Hut Program have shown general improvement, and the Boat Marina Program has met with considerable success.

laboratory services branch

Director: G.C. Ronan

The Laboratory Services Branch provides analytical support to the Ministry's environmental quality assessment and pollution abatement programs. In 1977-78, more pronounced diversification of field programs and increased characterization demands resulted in a considerable increase in the number and variety of tests required of the Branch. This, in turn, intensified the need for new methods and techniques and required more stringent quality control.

Tests Performed

The Branch performed 1,780,000 tests in 1977-78 as compared to 1,650,000 tests in 1976-77, an increase of approximately eight per cent. Of this number, 77 per cent were carried out by the Toronto laboratories, and generally required sophisticated instrumentation and special expertise. The remaining tests (23 per cent) were conducted at the Ministry regional laboratories in Kingston (7 per cent), Thunder Bay (5 per cent), and London (11 per cent). (See Table II, page 69.)

The Branch performed 48.2 per cent of the tests in support of regional programs; the rest, for other Ministry branches and government agencies. Analyses for the Air Resources Branch amounted to less than 10 per cent of the total due to many air quality parameters being determined by automatic field instruments.

Analytical Support for Special Programs

Special program support included tests for: the Pollution From Land Use Activity Reference Group (PLUARG) Program (40,000 tests); the Great Lakes Program (120,000 tests); the Sudbury Environmental Study (30,000 tests). Fewer tests were required by these programs in 1977-78 than in 1976-77.

Recreational lakes received more attention this year as attempts were made to relate water composition to health effects. The relation between the presence of Pseudonomas aeruginosa and ear infection outbreaks among bathers was examined in conjunction with an epidemiological study of the affected population.

Laboratory sections undertook and/or participated in major surveys for hazardous substances involving most of Ontario's aquatic and atmospheric environment. Asbestos analysis output was doubled. Among trace metals, mercury continued to be of major concern. Based on analytical data gathered over a number of years, projections indicating declining mercury levels in fish were borne out. In co-operation with other branches and ministries, staff participated in the collation and interpretation of mercury data in order to provide fish consumption guidelines for anglers.

The Branch made more than 20,000 tests each for lead, copper, zinc, and arsenic. Extensive surveys for PCBs and pesticide residues were carried out on fish collected from across the Province. Pesticide analysis was increased by nearly 50 per cent to include 100,000 tests.

Analysis for haloforms in drinking waters was continued with sample sources covering most of the Province. The St. Clair Study was further extended to include a wider spectrum of toxic organics possibly discharged by industries in that region. The effluents of each industry were analyzed, and the significance of the levels of organics were identified and evaluated. The presence of petroleum hydrocarbon residues in water was demonstrated in several cases, and the sources were identified and eliminated. The program to measure carcinogenic polynuclear aromatic hydrocarbons was continued, and in several areas the respective sources were identified.

Laboratory Organization

The Branch operated under a new organizational structure in 1977-78. Up to late 1976-77, samples were processed on the basis of being either air, water, or soil, etc. The new arrangement focuses primarily on the kinds of analytical tests required and has resulted in the development of a more comprehensive and thorough system for the examination of samples and in more detailed and informative reports being sent to the Branch's clients.

The Branch consists of seven sections:

- The Water Quality Section conducts specific routine water and wastewater quality tests.

- The Air Quality Section conducts specific routine air quality tests on atmospheric samples and trace metal tests on all types of environmental samples.

- The Pesticides Section conducts specific routine organic tests and non-routine analyses related to field work on all types of environmental samples.

- The Organic Trace Contaminants Section detects, identifies, and determines organic pollutants in all types of environmental samples.

- The Physical Methods Section determines physical and chemical properties of environmental samples by non-destructive techniques.

- The Microbiology Section determines bacteria levels in waters and wastewaters, identifies microorganisms, and conducts microbiological assessment of the mutagenity of pollutants.

- The Administrative Section handles personnel, finance, and general administration; operates the Laboratory and Research Complex safety program; administers the Central Stores for the Ministry.

The requirement to handle extremely toxic samples and chemicals, the need to provide more comprehensive analytical support, and an expanded provincial Fish Contaminant Monitoring Program necessitated the conversion of a staff cafeteria at the Resource Road complex into a pesticide analytical development laboratory. Although construction of this unit seriously interfered with the work of the Pesticides Section, the acquisition of a computerized and automated gas-chromatographic analytical system mitigated its effects on laboratory output.

The north wing of the old laboratory building was also renovated in order to relocate the laboratory staff from 880 Bay St., Toronto. Completion of this transfer ended four years of planning, building renovation, and work integration.

Development

In conjunction with the eight per cent increase in regular workload, an increasing demand for diagnostic-type services and investigative work created additional challenges. Analytical method development work continued, and the laboratory quality control program was reinforced and integrated into the entire analytical process. Continuing stress on automating laboratory analytical processes resulted in higher productivity, increased efficiency, and improved data quality.

Method Development

It was most important that new techniques and methods were developed and brought on-line during the year. The three main objectives were:

(1) to increase productivity and efficiency (automation and computer application);
(2) to widen the spectrum of analyses (application of new methodology);
(3) to improve analytical characteristics such as detection limit, sensitivity, precision, and accuracy (improved extraction, separation, and detection techniques, etc.).

Only a few manual procedures remain in the Water Quality laboratory where the manganese, ammonia, and total organic carbon tests were automated. Increased automation and computer control reduced the crew in the mercury laboratory from five people to three people. Spectrographic analysis is being further computerized. A fully-computerized spectrometer purchased at the end of the year will extend the application and output of the lab emission spectrometry analytical capability. Determination of trace elements by X-ray fluorescence was increased, and lead-testing with this technique was automated.

The determination of anions usually presents more problems than the analysis of trace metals. A Dionex ion exchange chromatograph was purchased and used for anion method development with satisfactory results. This technique is also amenable to automation.

Organic analysis was further automated. Haloforms in drinking waters were analyzed with an automated gas-chromatograph. A battery of four automated gas-chromatographs, directed by computer, conducted pesticide analyses. A bench-top gas chromatograph-mass spectrometer (GC-MS) system was added to instruments in the pesticide laboratory and applied to the identification of pesticides, PCBs, metabolites, and degradation products. GC-MS techniques were used to identify new organic pollutants. They were also combined with a sparging technique to scan biological materials such as fish tissue for volatile organics -- a one-day test that once took months to complete.

Methods were improved, developed, or adopted to: permit rapid and accurate determination of sulphur and chlorine in organic liquid wastes; to determine sulphur compounds in atmospheric samples; to speciate various forms of phosphorous compounds and complexes of trace metals; to identify petroleum hydrocarbon residues in drinking water.

A number of other methods were also modified. Hydrazine was introduced as a reducing agent in the nitrate method; the BOD technique was combined with the use of an automated oceanographic respirometer; a color determination method was developed which uses cobaltiplatinate standards; a GC technique to measure dissolved CO_2 was developed; a fluoride specific electrode was again investigated and recommended for low levels in water samples. Improvements made on the asbestos in water method permitted the publication of an interim procedure to be used in Ontario. Extensive study was carried out to establish the best sampling method and filtering media for asbestos in air. The Microbiology Section tested several media combinations to obtain the best recovery and identification of bacteria. The Section also started to develop facilities and skills to adopt the Ames test for the identification of mutagenic wastes and/or selectively isolated pollutants.

The Branch examined odour problems arising from the disposal of persistent organics and organic liquid wastes and developed several ad-hoc methods to identify offending compounds, including an odour kit for use in the field. The purging technique developed for fish analyses was used to determine odour and taste-causing substances in fish. To track down the sources of gasoline or fuel oil smells in drinking water, a positive tagging system was developed from compounds of the Musk family which permit detection of underground leaks of gasoline and fuel oil tanks.

Laboratory staff helped prepare a guide for the public which indicates, for most of Ontario's lakes, the degree of contamination to be expected in various fish species and illustrates which sizes of fish species may be regularly or intermittently consumed.

Quality Control

The Branch continued efforts to validate and record analytical methods. Systematic quality control became a regular part of analysis procedures for most parameters. Quality control results are kept separately and performance records prepared periodically. The effectiveness of quality control was demonstrated by excellent results obtained in inter-laboratory round-robin comparison tests initiated by the International Joint Commission and other agencies.

Data-handling for many tests was increasingly computerized which greatly reduced errors of manual registration, search, and handling. The "Guide to the Collection and Submission of Samples for Laboratory Analysis" was revised and published. Use of the booklet's guidelines reduces errors arising from faulty sampling techniques.

Shipping & Stores

The Toronto Central Laboratory handles shipping and storage functions for the Ministry. An inventory of 360 chemical, glassware, and miscellaneous stock items worth $300,000 was maintained to provide support to field and laboratory activities. Over 280,500 bottles and supply items were shipped to field units and regional laboratories, and 460,000 bottles were processed by the Glass-washing Unit to ensure an adequate supply of sample bottles.

Safety Program

1977-78 was the first year in which the Laboratory and Research Complex had the services of a full-time safety officer. A comprehensive safety program was instituted that involved on-the-job safety training of employees, regular safety inspections of the complex, and the formation of a joint staff-management safety committee.

Other Activities

Laboratory personnel participated in a number of technical committees including several connected with the International Joint Commission and Canada-Ontario co-operative programs. In 1977-78, they presented 16 papers at scientific gatherings, had 17 papers published in technical journals, and prepared 148 technical reports.

A newsletter was started in 1977-78 to inform users of Laboratory Services about work conducted by the staff and developments in the field of environmental analysis. The publication was favorably received and should lead to more efficient use of available service.

finance and administration division

Executive Director: G.E. Higham

financial and administrative services branch

Director: W.D. Wood

As a result of the additional constraints imposed by Management Board, the Financial Services Branch was amalgamated with the Administrative Services Branch in October 1977 to become the Financial and Administrative Services Branch. At the same time, the Library Services Section was transferred to the Information Services Branch and the Cartography and Drafting Section was transferred to the Water Resources Branch.

Office Services Section

This Section maintains services to the Ministry in the following areas: the allocation of accommodation and parking, the procurement of printing, records and forms management, mail and messenger services, assets control, head office stockroom functions, the Policy and Procedures Manual, and telecommunications services. The Section also administers the Photocopier Control Program established by Management Board in August 1977.

Purchasing Unit

In spite of restraints, this Unit maintained a high level of service to clients within Anti-Inflation Board guidelines. During the calender year, 1977, the Unit received 12,027 requisitions and issued 10,230 purchase orders for a total value of 27.8 million dollars.

Systems Development Section

This Section continued work on a wide variety of systems in conjunction with Ministry branches, including:

Air Resources Branch: The Air Quality and Meteorology Information System was modified and extended. The Automotive Emission System was revamped. An assessment of the information needs of the Nanticoke Environmental Management Project was initiated.

Water Resources Branch: The capabilities of the Sample Information System were extended. More water modelling techniques were added to their repertoire. Feasibility studies were conducted and requests for proposals for the development of a Limnology Information System and a Toxicity Information Monitoring System were prepared.

Pollution Control Branch: The Utility Water Pollution Monitoring System was developed, and an assessment of waste site information needs was initiated.

Environmental Approvals Branch: The Environmental Assessment Project Information System was implemented.

Project Co-ordination Branch: The capabilities of the Utility Project Management System were extended.

Laboratory Services Branch: Feasibility studies were conducted, and requests for proposals were prepared for the acquisition of mini-computers to handle the mercury in fish and microphotometer monitoring systems. The feasibility of developing an automated Laboratory Information System was reassessed with the result that a request for proposal was prepared for distribution to suppliers.

Regional Branches: A survey of data processing equipment and facilities was conducted in order to explore alternatives for facilitating program and data exchange between the regions and head office.

Financial and Administrative Services Branch: The Utility Rate Information System was improved and its capabilities extended.

The Ministry also conducted a broadly-based study that involved the assessment of existing information systems, documentation of future needs, establishment of priorities consistent with long-term Ministry plans, and development of a long-term information plan. Also studied were the closely related subjects of resource recovery requirements, organization, and service sources.

Systems Operation Unit

This Unit increased the size of its Remote Job Entry (RJE) Computer Terminal with the addition of a third printer and tape drive. A communications link with the Queen's Park Computer Centre was established.

The following new systems became operational this year: the Industrial Wastes System, the Utilities Monitoring System, and the RJE Accounting System. Modifications were made to the River Basins System and the Great Lakes System.

Capital Financing & Revenue Section

The Capital Financing and Revenue Section is responsible for the financial management of the Province's investment in water and sewage works projects, processing of claims under cost-sharing agreements, and acting as financial consultants to Ministry branches and municipalities.

In 1977-78, the Section provided financial, accounting, and reporting requirements for 460 projects under term-financing agreements and for 225 projects under long-term service agreements. These projects had a net investment value of $880 million ($1,062 million gross value) and generated revenues of $62.5 million. The service agreements provide for periodic rate reviews of gallonage charges which recover the cost of financing and operation. During the year, the Section conducted 93 reviews and negotiated service rates with municipalities.

Section staff participated in the development of a new grant structure for water and sewage works and an agreement for a Waste Well Disposal project.

The Pollution Abatement Incentive Act was wound-up during the year. The table below shows the total grants provided during the life of the Act.

TABLE OF GRANTS

UNDER THE POLLUTION ABATEMENT INCENTIVE ACT

Fiscal Year	Appropriation	Actual Claims	Actual Amount
1970/71	statutory	164	$ 413,881
1971/72	2,000,000	559	1,944,889
1972/73	2,750,000	176	2,307,076
1973/74	3,750,000	249	1,571,963
1974/75	2,750,000	517	2,749,389
1975/76	3,250,000	564	3,242,125
1976/77	4,270,000	366	4,269,917
1977/78	1,840,000	213	1,839,357
	TOTAL	2,808	$18,338,597

Accounts Payable Section

This Section is responsible for the processing for payment of all supplier accounts, grants, subsidies, and travel claims. During the year a total of 71,000 batches of invoices were processed for budgetary expenditures amounting to $113.5 million and 9,000 batches of invoices were processed for disbursements and charges amounting to $137.6 million.

Accounting Records and Budget Control Section

This Section is responsible for providing a management information system, accounting records and budgetary control for all Ministry revenues and expenditures. In addition, the Section provides cashiering and cheque distribution services to the Ministry.

legal services branch

Director: J.N. Mulvaney, Q.C.

Legal Services staff are employed by the Ministry of the Attorney General and provide legal services on a solicitor and client basis to the Ministry of the Environment.

A major function of the Branch is the conduct of prosecutions under environmental legislation. The Branch screens cases being considered for prosecution, advises on the best methods of gathering and presenting evidence, and provides counsel to present these cases in court. In addition, it acts as counsel for any director whose decision under a statute is being reviewed in a hearing

before the Environmental Appeal Board or other review tribunal.

During 1977-78, the highest fine assessed under Ministry legislation was $14,400 against York Sanitation Company Limited. In October 1977, the Branch was involved in the argument of The Queen vs. The City of Sault Ste. Marie before the Supreme Court of Canada. This was the first prosecution of a pollution offence to come before that Court, and it established new principles of law with respect to not only pollution prosecutions but also all offences under provincial statutes.

Other legal services included: acting as counsel in arbitration hearings under construction contracts, advising on the appropriate application of the Ministry's powers, and advising on the form of documents and orders which can be issued by directors under the legislation. The Branch also provides legal advice to the operating branches and prepares Orders-in-Council, regulations, contracts, and orders.

personnel services branch

Director: R.E.B. Burns

The implementation of a new manpower control program resulted in approximately 130 contract employees being appointed to the classified service. These employees had been employed by the Ministry for considerable periods. A continual monitoring of the new program based on dollars committed rather than on persons employed is to be carried out by the Staffing Section.

In the late fall of 1977, the affirmative action program was geared to a management-by-results plan. This committed managers to career planning interviews with individual female staff members with continued emphasis on training and development.

A new employee appraisal program was introduced to the Ministry; 240 staff attended 24 training sessions on "How to Conduct Employee Appraisal". This program, particularly with respect to the evaluation of management employees, is based on the evaluation of performance against pre-established goals.

The implementation of the compensation system known as "broadbanding" continued during the year. This system requires the Branch to ensure that those positions which are allocated to the broadbanding system are management positions as determined by the Crown Employees Collective Bargaining Act. It also requires the Branch to determine alternative allocations of some positions in bargaining unit classes.

The Branch formalized local and Ministry employee relations committees as provided for in the Collective Agreement between the Management Board of Cabinet and the Ontario Public Service Employees Union. Meetings were held at the Ministry's head office and will be extended to regional offices, the Laboratory Services Branch, and the South Peel system during the upcoming year.

A Central Attendance Recording System (CARS) developed by the Civil Service Commission was introduced. This computerized attendance system will provide employees with quarterly reports as to their attendance and vacation credits and management with information concerning the financial consequences and impact of absences during the year.

Training and Certification Section

Training

During 1977-78, this Section conducted 23 courses and workshops on 49 occasions for 795 Ministry and 543 non-Ministry personnel. Thirty-one trainees came from other provinces. Principal effort was directed at training water and wastewater treatment plant operators; 30 per cent of the program was oriented to Ministry staff, municipal inspectors, and industry personnel. (See Table III, page 70.)

A training centre was established at the Ministry's Experimental Facility (OEF) Brampton, Ontario, incorporating classroom, laboratory, and workshop facilities. Most of the Section's future courses and workshops dealing with plant operations are to be conducted at that location.

Certification

Seventy-six Ministry staff were re-certified in the Identification of Opacities of Visible Emissions, while 17 staff members obtained initial certification.

Twenty trainees were certified as Noise Control Officers after completing Parts I and II of the Acoustics Technology Course, including eight Ministry staff members, 11 municipal employees, and one industry representative.

Discussions were initiated with the Ontario Municipal Engineers Association on the development of a program for the voluntary certification of water and wastewater utility operators.

At year-end, the Training and Certification Section was transferred from the Personnel Services Branch to the Pollution Control Branch.

program planning and evaluation branch

Director: A. Castel

The Program Planning and Evaluation Branch conducts operational and policy evaluation studies relating to environmental planning, environmental control, resource recovery, and administrative support services. Primary goals are: 1) to ensure a rational allocation of available resources to programs, and 2) to assess program effectiveness and efficiency.

The Branch develops the annual estimates and acts as liaison with the Policy and Priorities Board, the Cabinet Committee on Resources Development, Management Board, and other ministries.

Implementation of Management-by-Results (MBR) involved completion of Phase I and establishment of performance monitoring procedures leading to an annual report for all operational programs.

Improvements to MBR programs already in use resulted in revised proposals for water and sewage works construction. Analysis of program options for Part VII of The Environmental Protection Act for private water and sewage will lead to revised program delivery.

Assessment of Ministry approval functions was completed.

Implications of the report from Policy Field on the impact of the Grants Reform Committee recommendation were evaluated with regard to Ministry programs.

During 1977-78, the Branch became increasingly involved in analysis of policies for capital expenditures. The job creation potential of Ministry programs in light of general economic conditions became an important assessment tool.

internal audit branch

Director: E.F. Heath

During 1977-78, the Internal Audit Branch carried out a comprehensive program of financial audits throughout the Ministry to evaluate:

(1) the accuracy of Ministry records;
(2) staff compliance with established and approved policies, guidelines, and procedures;
(3) the effectiveness, efficiency, and practicability of the systems of internal controls designed to protect and safeguard the Ministry's assets, revenues, and expenditures.

The Branch conducted in-depth reviews in selected areas and monitored specific ongoing expenditure and revenue transactions on a continuing basis at the request of management.

The Branch performed audits with regard to:

(1) revenues, expenditures, and disbursements including grants, bursaries, and financial transactions with other Ministries and outside agencies;
(2) regional office operations;
(3) the attendance reporting system and records.

The Branch also performed in-depth reviews in the area of recoverable and accountable advances, and continued to review new systems, procedures, and proposed controls with the staff of other branches.

information services branch

Director: R.J. Frewin

The Branch continued to provide a full range of communications and customer information services aimed at keeping the public informed of Ministry policies and activities.

In January 1977, the Branch assumed responsibility for co-ordination of the communications campagin supporting Ontario's ongoing fish testing program conducted by Environment Ontario, the Ministry of Natural Resources, and medical advisers of the Ministry of Labour's Occupational Health and Safety Division.

Five booklets containing the analyses for possible contaminants in fish from more than 450 Ontario water bodies were published and made available to the public in April 1978. In order to keep the public informed of current test results as these were completed, and prior to publication of the annual compendiums, 12 environmental bulletins were prepared and distributed on a monthly basis.

Since the information program got under way in the summer of 1977, more than 300,000 information pamphlets "Guide to Eating Ontario Sport Fish" and approximately 10,000 technical manuals containing complete test results have been produced and distributed.

For the third year Environment Ontario participated with the Ministry of Health and with local Officers of Health in a mosquito control program aimed at controlling the breeding of mosquitoes, a certain species of which has been identified as carriers of encephalitis virus. The joint information program is intended to advise householders of measures which they can undertake to prevent breeding of mosquitoes on their properties, and to inform them on recognizing the symptoms of the virus. More than 500,000 pamphlets, both French and English, were distributed and an extensive advertising and publicity campaign was mounted to inform the public about the government's control program.

Participating with Environment Canada, the Branch organized public meetings in Thunder Bay and Toronto in support of the Great Lakes Water Quality Board of the International Joint Commission and to stimulate interest and public input to the renewal of the 1972 Canada-United States agreement on water quality. The meetings were well attended and 50 briefs were presented by groups and individuals and later published as a record of these meetings.

Branch staff also co-ordinated media liaison and publicity activities on behalf of the 70th annual meeting of the International Air Pollution Control Association in Toronto which was attended by more than 4,500 delegates and members from all parts of the world.

The Branch also co-ordinated communications' activities on behalf of the Industrial Waste Conference; the York-Durham Water and Sewage Treatment Project; and the Metro Toronto Lead Committee and the Clean-up Program.

A highlight of the Branch's activities was completion of a documentary film, "Lake Odyssey", which narrates the Ministry's experimental weed harvesting program in the Kawartha Lakes. During the summer of 1978, a short version of the documentary was shown at commercial theatres in Toronto, St. Catharines, Hamilton, Peterborough, London, and Kingston.

The Ministry's educational program included the production and distribution of lesson plans for the teaching of environmental studies to 4,000 elementary and secondary school teachers and a comprehensive manual on environmental activities to more than 500 camp leaders.

Staff assisted in several major environmental teaching conferences and workshops during the year, including: sessions for teachers on professional days; an Ontario Camping Association workshop; a symposium on government education programs; and a Ministry-organized workshop for teachers of handicapped children.

The special "Envirovan" summer program included sessions at 48 provincial parks and at many children's camps at which environmental seminars were held.

The Branch provided support to the Ministry's six regions, including participation in 12 exhibitions and fairs, and offical openings were staged for 12 new water and/or sewage treatment facilities completed during the year.

A new environmental arcade exhibit proved popular with approximately 800,000 visitors to Ministry displays at the Royal Winter Fair, at the CNE, Soo Conservation Week, Thunder Bay Exhibition, London's Western Fair, the Central Canada Exhibition in Ottawa, and the Pollution Control Show. The Ministry also participated in the Toronto Garden Show, the Plant Show, the International Plowing Match, the International APCA Convention, and the CNE.

Production of brochures and "Fact Sheets" was expanded, with 22 titles added to the number of publications available to the public, seven of which were in French. This brought the total number of publications distributed by the Branch to 102, of which approximately two million pieces were distributed during the year. "Legacy", the Ministry's bi-monthly newspaper, has grown to a circulation of 22,000.

A number of audio/visual shows were prepared as information support for a variety of Ministry programs and as documentaries.

Extensive photographic evidence and aerial photography work was provided for the Legal Services Branch.

During the year, administration of the Ministry's Library Section was transferred to the Information Services Branch. The Library Section includes a major facility serving both Ministry staff and the public at our head office at 135 St. Clair Avenue West in Toronto, and a smaller facility which serves the central laboratory on Resources Road in Islington.

During the year the Library acquired 1,817 technical books and manuals, subscribed to and circulated 335 journals and periodicals, and conducted 519 computer searches for scientific data and information, mostly related to the work of our laboratories.

As part of the Ministry's customer information service, the central library responded to 9,650 reference questions, mainly from students at all levels; loaned 11,072 books and reports, circulated 17,506 journals and technical papers, and processed 53,963 photocopies of material for Ministry staff, other ministries, and the public.

boards and commissions

the waste management advisory board

Chairman: R.H. Woolvett

The Waste Management Advisory Board formulates policy and advises the Minister of the Environment on matters pertaining to the management of waste in Ontario. The Board places particular emphasis in its work on waste reduction, recovery, and recycling.

The Board consists of 11 members drawn from diverse backgrounds and locations across the Province. In 1977-78, the Board held 11 meetings totalling 20 days. Six committees also held 31 meetings to consider a wide range of waste management issues and programs.

At the Board's instigation, two industry working groups were formed: the Working Group on Waste Paper Utilization and the Industry Task Force Committee on Fluid Milk Packaging.

The 12-member Working Group on Waste Paper Utilization consists of representatives from paper producers, publishers, brokers, insulation manufacturers, municipal government, a paper union, and the citizen sector. It was appointed by the Board in January 1978. Purpose of the Group is to identify, develop, and assist in the implementation of processes, products, or systems that will increase the use of waste paper in Ontario, while bringing real savings and/or economies to agencies implementing such programs.

The Industry Task Force Committee on Fluid Milk Packaging was formed, at the request of the Board, by the Ontario Dairy Council and the Retail Council of Canada. The Committee is to review all packaging presently used

for the sale of fluid milk in Ontario and to oversee the development of a family of generic refillable milk containers.

The Board also initiated and/or completed:

(1) urban solid waste generation studies, including Report No. 1 of the Waste Indices Committee (Urban Solid Waste Generation in Ontario), and Report No. 2 of the Waste Indices Committee (Solid Waste Management Cost Accounting and Monitoring Study);
(2) general packaging investigations including the development of environmental guidelines for packaging of consumer products, the evaluation of environmental characteristics of packaging materials, and the identification and selection of packaging systems suited to standard reusable applications;
(3) residential source separation studies, including the assessment of significant source separation programs, a home composting pilot project (Phase I), and the design of practical low-cost home composting devices;
(4) paper recovery projects, including development of an implementation manual on office paper recovery and a methodology for systematic data collection on waste paper markets;
(5) an environmental impact study of fluid milk containers;
(6) a study of wine and spirits packaging in Ontario;
(7) a study on the recovery and use of waste motor oil;
(8) an investigation of waste management practices in selected government ministries and agencies;
(9) carbonated soft drink packaging investigations, including an evaluation of the employment impacts for seven policy alternatives, the development of standard soft drink containers, and a study on the impacts of standard refillable soft drink bottles;
(10) a non-carbonated soft drink container study.

the environmental assessment board

Chairman: D.S. Caverly

The Environmental Assessment Board conducts hearings under The Environmental Assessment Act, The Ontario Water Resources Act, and The Environmental Protection Act. The Board also conducts hearings from time to time regarding environment-related matters at the direction of the government through Orders-in-Council.

Under the direction of a full-time chairman, the Board is composed of part-time members from various walks of life across the Province. The appointment in 1977 of S. Montgomery, a farmer from Hawkesbury, and G.J. Stopps, a medical doctor with the Department of Preventive Medicine and Biostatistics at the University of Toronto, brought the total strength of the Board to 16 members.

During 1977-78, the Board held ten hearings under The Ontario Water Resources Act and 14 hearings under The Environmental Protection Act. The Board also continued a hearing, as directed by two Orders-in-Council, concerning uranium mine expansion in the Elliot Lake Area. This hearing is expected to conclude in 1978-79.

On February 22, 1978, an Order-in-Council was passed authorizing and directing the Board to conduct a hearing regarding a proposal to burn polychlorinated biphenyls

(PCBs) at the St. Lawrence Cement plant in Mississauga. The hearing is expected to commence late in the fall of 1978.

the pesticides advisory committee

Chairman: Dr. D.N. Huntley

The Pesticides Advisory Committee annually reviews The Pesticides Act, its Regulations, and government publications concerning pests and pesticides. The Committee also enquires into matters concerning pesticides and the control of pests as deemed necessary or as prescribed by the Regulations.

In 1977-78, the Committee consisted of 16 members representing agriculture, industry, universities, and government. Several membership changes took place. Mr. P.M. Lindley, an able member of the Committee since its establishment, resigned in December 1977. Two new members, Dr. R. Dorland, Ministry of Health, and Mr. A. Gartner, Utopia, Ontario, were appointed by Order-in-Council.

The Committee recommended several changes to Ontario Regulation 618/74, reviewed and evaluated the environmental impact, toxicity, and hazard of 11 new pesticide-active ingredients; reassessed four previously-classified compounds; evaluated 220 newly-registered pesticide products and recommended for each a classification for storage, sale, and use in Ontario. Amended guidelines for federally 'Restricted' pesticide products were established, and products affected were reclassified. A number of investigations were carried out including the use of D.D.T. for the control of mice and bats, and recommendations were made to the Ministry. A report by the Committee on personal protective equipment for pesticide users released in 1975 was updated and published in November 1977.

The Committee continued a research program established in 1973 with three major objectives:

(1) to find alternative pesticides for those deemed environmentally-hazardous and those restricted in use;
(2) to determine potential environmental hazards with pesticides currently in use;
(3) to reduce pesticide input into the environment.

The Committee received 35 research proposals, 20 of which were funded by the Ministry through the Committee at a total cost of $195,940. A two-day research seminar was held in January 1978 at which fund recipients presented progress reports. An assessment of pesticide research projects funded through the Committee was prepared and submitted to the Ministry.

All 1977-78 publications of the Ministries of Agriculture and Food, Environment, and Natural Resources, concerned with pesticides were reviewed and endorsed prior to printing and distribution.

the environmental appeal board

Chairman: I.W. Pasternak, Q.C.

The Environmental Appeal Board provides an appeal forum for persons affected by certain decisions made by

the Ministry of the Environment or local health units. It consists of seven part-time members, including the Chairman, from various occupations and parts of the Province.

In 1977-78, the Board received 49 Notices of Appeal and held 32 Hearings in various locations in Ontario. The majority of the appeals concerned decisions of the Ministry or local health units on private sewage systems. The remaining appeals resulted from Ministry decisions regarding a waste disposal site, sewage and water works, and the emission of contaminants into the environment from several mines and from a rail-spill.

The Board resolved the 27 appeals from the previous fiscal year and dealt with 35 of the 49 appeals received in 1977-78. Decisions remain to be issued or hearings held on the remaining 14 appeals.

the pesticides appeal board

Chairman: J.R. Swanborough, Q.C.

The Pesticides Appeal Board provides an appeal forum for persons affected by Ministry decisions under The Pesticides Act, regarding the licensing of pest control operators and exterminators, and the use and control of pesticides. It consists of a part-time chairman and six part-time members.

The Board received only two Notices of Appeal in 1977-78 as compared to 22 Notices of Appeal in 1976-77. One of the two appeals was later withdrawn; the other was scheduled to be heard in April 1978.

The Board issued decisions on 11 outstanding appeals from the previous year.

the farm pollution advisory committee

Chairman: Otto Crone

The Farm Pollution Advisory Committee is comprised of four farmers. Its concern is to provide objective assessments of farm environmental situations. When requested by Ministry officials, the Committee visits farms to investigate complaints and makes recommendations that should be employed regarding manure storage, spreading, cultivation, yard drainage, and ventilation of livestock and poultry buildings.

The Committee visited four farms in 1977-78: two hog farms, one beef farm, and one chicken broiler farm.

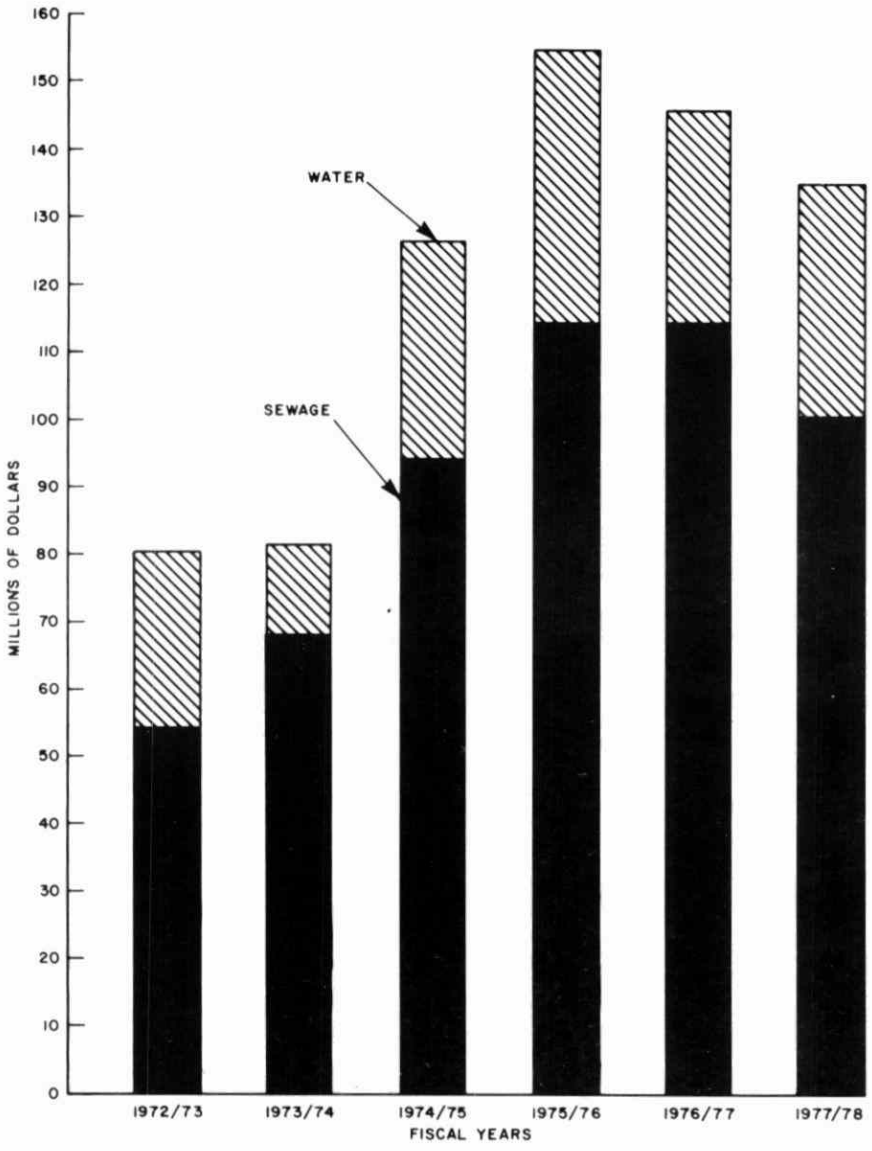
Concerning one hog farm, the Committee had one recommendation regarding drainage, and the owner agreed to comply. The Committee found the other hog farm to be poorly operated and made several recommendations. The owner indicated, however, that he was selling the farm, and the new owner would be changing it to a white veal operation. Follow-up will be required by the Ministry.

The beef farm is a very large feedlot. It produces some odour but is being operated in good fashion. The chicken broiler farm is operated in an excellent manner and cannot be improved upon.

appendices

ANNUAL TOTAL EXPENDITURE BY PROJECT TYPE
(1972/73 - 1977/78)

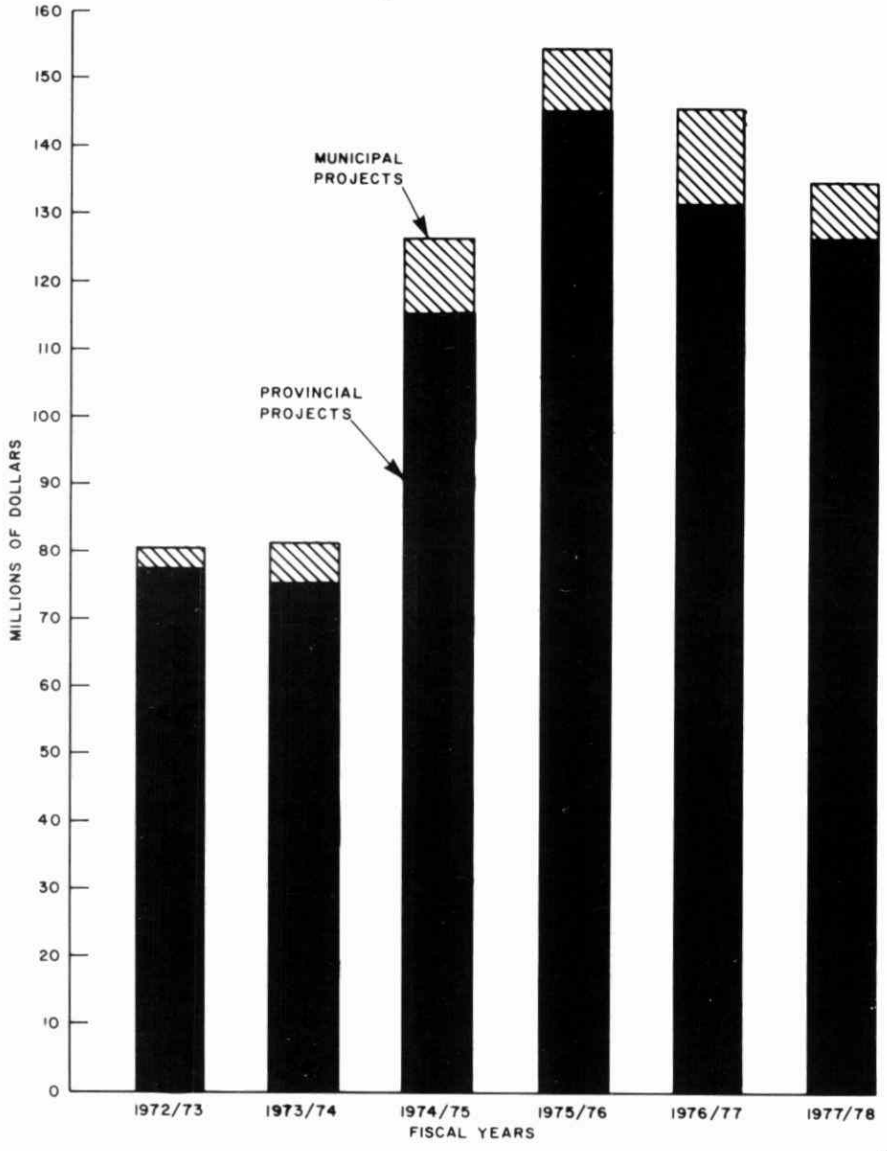
Source: Project Co-ordination Branch



GRAPH I

ANNUAL TOTAL EXPENDITURE BY CLASS CAPITAL
CONSTRUCTION PROGRAM (1972/73 - 1977/78)

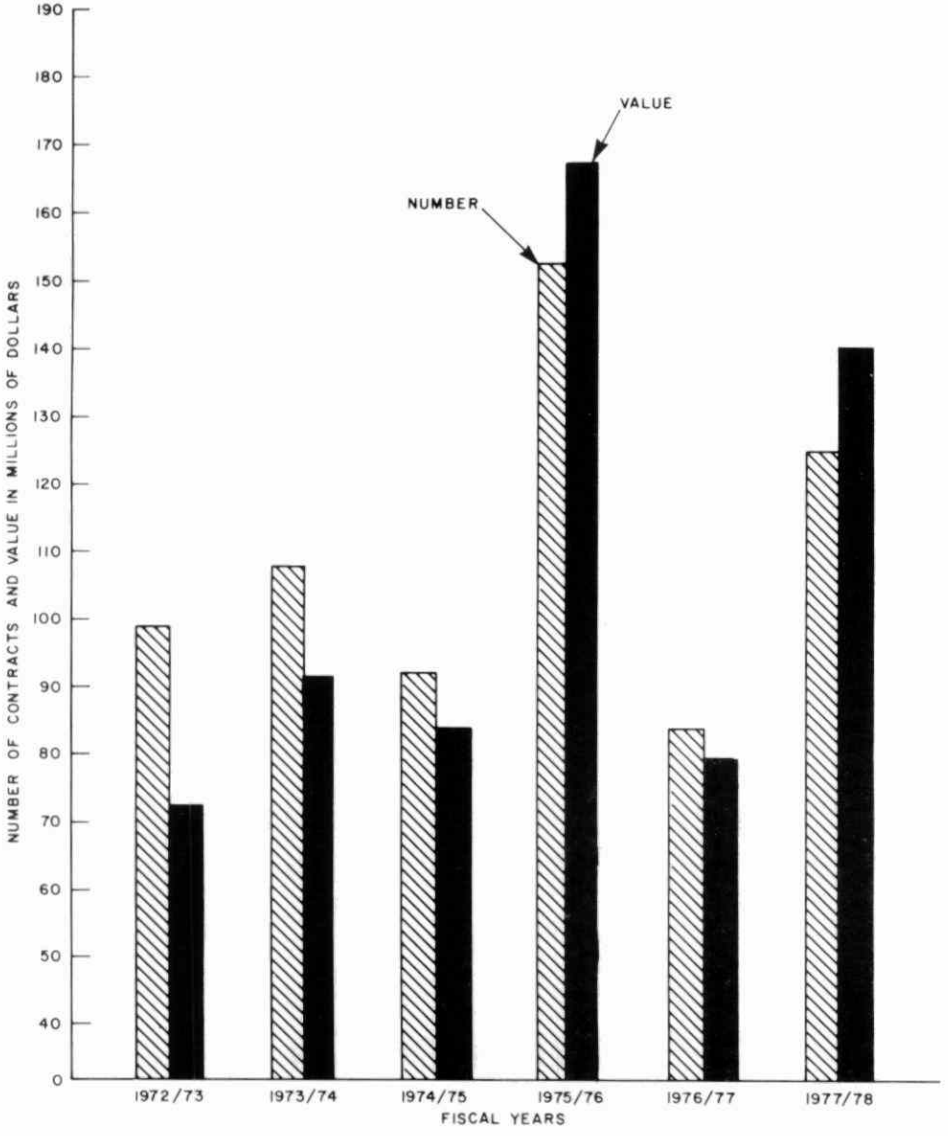
Source: Project Co-ordination Branch



GRAPH II

NUMBER AND VALUE OF CONTRACTS TENDERED ANNUALLY
(1972/73 - 1977/78)

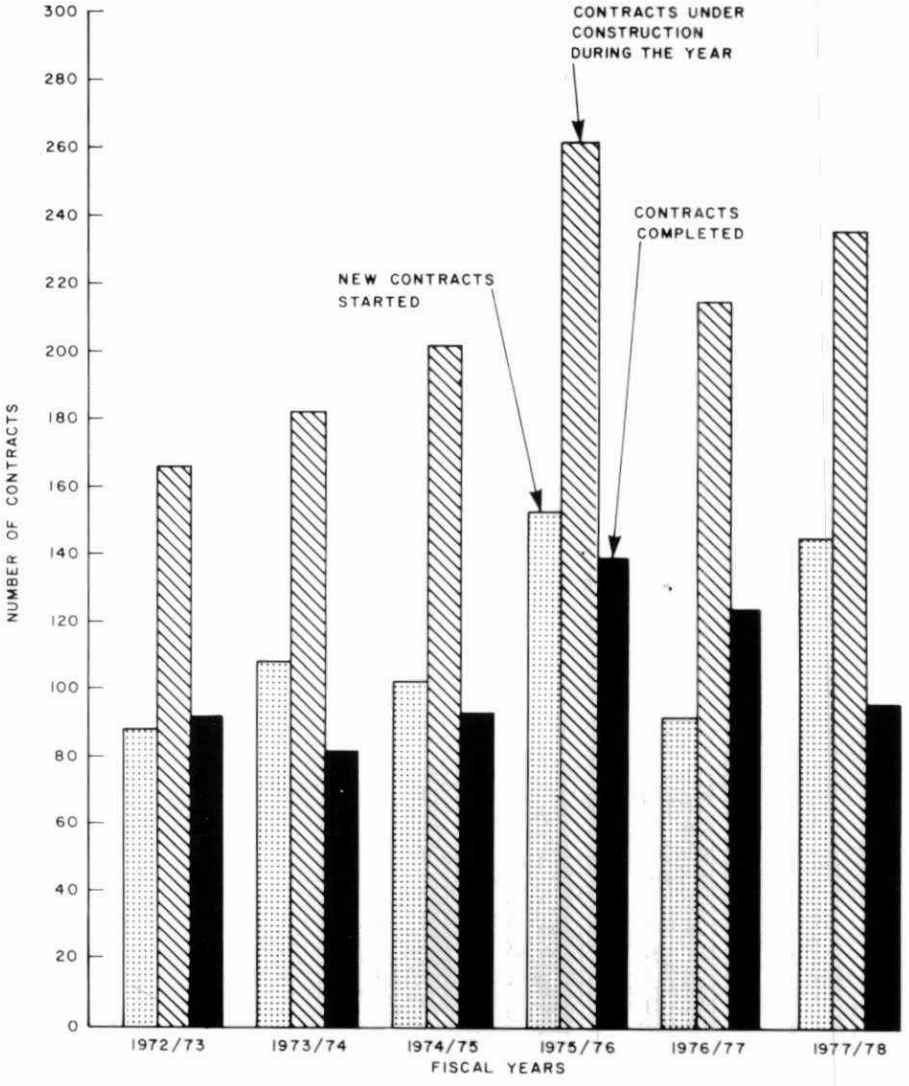
Source: Project Co-ordination Branch



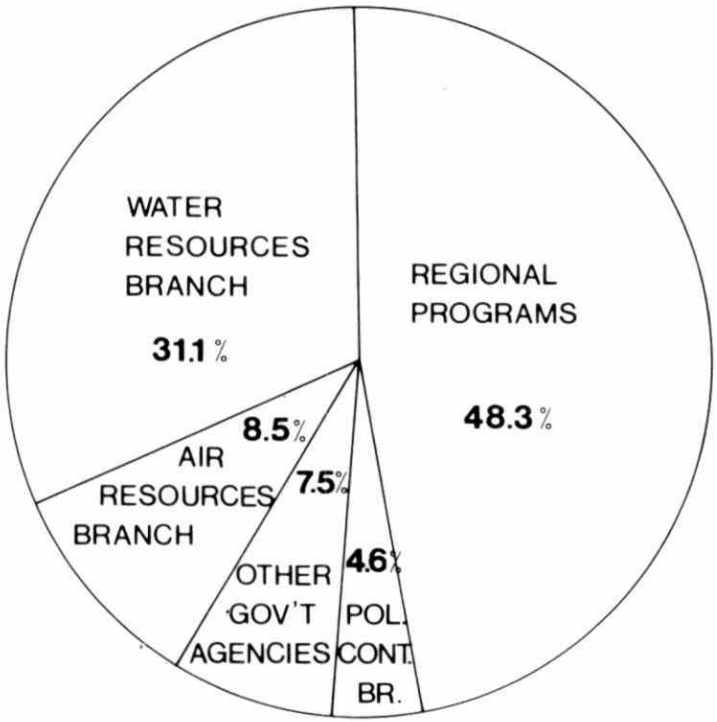
GRAPH III

ANNUAL VOLUME OF ACTIVITY
(1972/73 - 1977/78)

Source: Project Co-ordination Branch



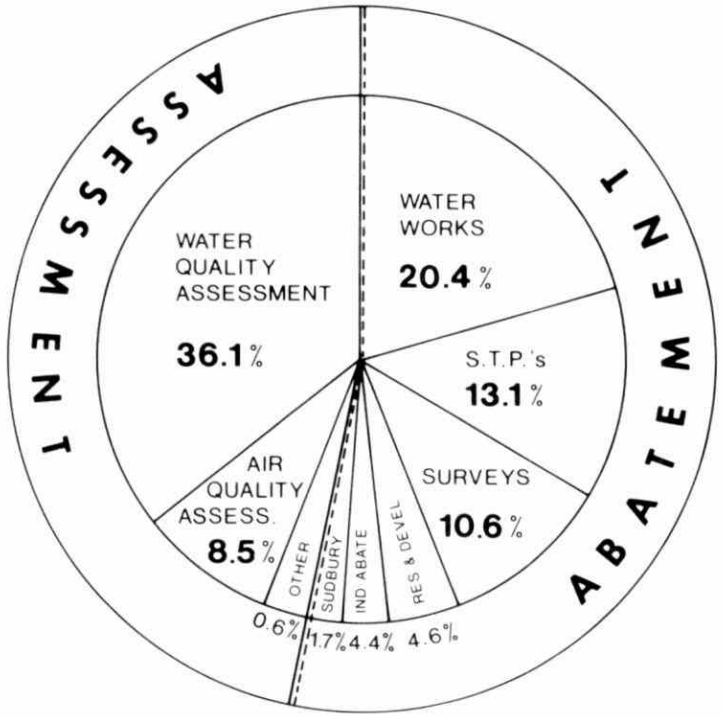
GRAPH IV



TEST LOAD DISTRIBUTION 1977/78

GRAPH V

Source: Laboratory Services Branch



TEST DISTRIBUTION BY PROGRAM 77/78

GRAPH VI

Source: Laboratory Services Branch

TABLE I

PROJECT CO-ORDINATION BRANCH

Volume of activity under Capital Construction Program during 1977-78:

1)	Capital Expenditure	$ 135,085,000
	Sewage Works	$ 100,994,000
	Water Works	$ 34,091,000
	Provincial Projects	$ 126,962,000
	Municipal Projects	$ 8,123,000
	Provincial Subsidy	$ 57,410,000
	% of total expenditure	% 42.5
2)	Construction	
	Contracts Tendered - No.	125
	- $ Value	$ 140,484,000
	Contracts Started - No.	145
	- $ Value	$ 139,296,000
	Contracts Completed - No.	96
	- $ Value	$ 103,847,000
	Contracts Under Construction During the Year	236
	Average Number of Contracts Under Construction in each month	127
3)	Grants to Regional and Restructured Municipalities	
	No. of Municipalities Participating	14
	Value of Grants Paid	$ 20,350,000

TABLE II

TESTS PERFORMED, 1977-78

LABORATORY	1976-77 Tests x 1000	1977-78 Tests x 1000	Change %	% of Total 1976-77	% of Total 1977-78
Toronto Laboratory					
Water Quality	774	754	- 2.6		
Air Quality	255	299	+17.3		
Organic Trace Cont.	36	49	+36.1		
Pesticides	70	103	+47.1		
Physical Methods	-	15	NA		
Microbiology	137	140	+ 2.2		
TOTAL TORONTO LAB.	1,272	1,360	+ 6.9	77.1	76.4
London	182	200	+ 9.9		
Thunder Bay	92	84	- 8.7		
Kingston	104	136	+30.8		
TOTAL REGIONAL LABS.	378	420	+11.1	22.9	23.6
TOTAL LAB. SERVICES BR.	1,650	1,780	+ 7.9	100.0	100.0

NA = non applicable

TABLE III

TRAINING & CERTIFICATION SECTION

STUDENT INTAKE

April 1977 - April 1978

NO. OF COURSE	COURSE	MOE	MUN.	IND.	O/S PROV.	TOTAL
1	Acoustics Technology I	11	9	1	-	21
1	Acoustics Technology II	7	11	1	1	20
1	Acoustics Technology III	4	12	1	1	18
2	Land Use Planning	18	29	17	1	65
5	Activated Sludge Workshop	55	50	-	5	110
5	Basic Gas Chlorination	39	65	5	3	112
4	Basic Sewage Treatment	52	56	9	2	119
2	Basic Water Treatment	25	37	2	4	68
2	Construction Inspectors	2	59	23	5	89
1	Industrial Air Abatement	15	-	-	-	15
1	Maintenance Gas Fitters	7	5	-	-	12
3	Preventive Maintenance	24	37	-	1	62
3	Primary Treatment	33	14	-	-	47
3	Pump Operations Workshop	28	35	-	1	64
1	Sewer & Watermain Design	2	32	20	-	54
6	First Aid Course	64	3	-	-	67
1	Gas Testing	50	-	-	-	50
2	Surface Water Treatment	25	12	-	2	39
1	Visible Emissions	76	-	-	1	77
1	Monitoring Water/Wastewater	33	3	-	4	40
1	Water/Sewage (Kingston)	18	-	-	-	18
1	Water/Sewage (Niagara)	-	15	-	-	15
1	Law Enforcement Course	157	-	-	-	157
49	TOTAL:	745	484	79	31	1,339

OUTSIDE PROVINCE REPRESENTATION

Acoustics	- Edmonton
Land Use Plan	- Saskatchewan
Basic Gas	- Halifax; B.C.
	- Winnipeg
Basic Sewage	- Winnipeg
Basic Water	- Halifax; N.W.T.
Monitoring Water	- N.S.; P.E.I.
Activated Sludge	- B.C.
Construction Inspectors	- N.S.
Preventive Maintenance	- N.W.T.
Pump Operations	- B.C.
Surface Water	- B.C; P.Q.
Visible Emissions	- Alberta

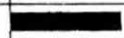
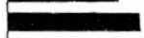
Source: Personnel Services Branch

TABLE IV

ONTARIO'S AIR POLLUTION INDEX

DATE STARTED

TORONTO	MARCH 23, 1970	WELLAND	JANUARY 1, 1974
HAMILTON	JUNE 15, 1970	NIAGARA FALLS	NOVEMBER 1, 1974
SUDBURY	JANUARY 16, 1971	CONISTON	FEBRUARY 18, 1975
WINDSOR	MARCH 19, 1971	NEW SUDBURY	MARCH 1, 1976
HAPPY VALLEY (CLOSED JANUARY 1975)	MAY 13, 1971	SARNIA	DECEMBER 1, 1977

YEAR	CITY	NUMBER OF OCCASIONS 10 ≥32 30	10 ≥50 30
1970	TORONTO		
	HAMILTON		
1971	TORONTO		
	HAMILTON		
	SUDBURY		
	WINDSOR		
	HAPPY VALLEY		
1972	TORONTO		
	HAMILTON		
	SUDBURY		
	WINDSOR		
	HAPPY VALLEY		
1973	TORONTO		
	HAMILTON		
	SUDBURY		
	WINDSOR		
	HAPPY VALLEY		
1974	TORONTO		
	HAMILTON		
	SUDBURY		
	WINDSOR		
	HAPPY VALLEY		
	WELLAND		
	NIAGARA FALLS		
1975	TORONTO		
	HAMILTON		
	SUDBURY		
	WINDSOR		
	WELLAND		
	NIAGARA FALLS		
	CONISTON		
1976	TORONTO		
	HAMILTON		
	SUDBURY		
	WINDSOR		
	WELLAND		
	NIAGARA FALLS		
	CONISTON		
	NEW SUDBURY		
1975	TORONTO		
	HAMILTON		
	SUDBURY		
	WINDSOR (12008)		
	WELLAND		
	NIAGARA FALLS		
	CONISTON		
	WINDSOR (12016)		
	NEW SUDBURY		
	SARNIA		
1978	TORONTO		
	HAMILTON		
	SUDBURY		
	WINDSOR (12008)		
	WELLAND		
	NIAGARA FALLS		
	CONISTON		
	WINDSOR (12016)		
	NEW SUDBURY		
	SARNIA		

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